

# LEE COUNTY MPO ROUNDABOUT STUDY

Final Report



LEE COUNTY MPO ROUNDABOUT STUDY  
FINAL REPORT  
Contract J01-2015-4414

PREPARED FOR:  
Lee County MPO

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IN ASSOCIATION WITH:  
Alternate Street Design

DATE:  
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## **Acknowledgements**

Lee County Metropolitan Planning Organization  
Florida Department of Transportation  
Lee County MPO Roundabout Steering Committee

## **Technical Team**

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Alternate Street Design  
Johnson Engineering  
E.F.Gaines Surveying Services  
Sanibel Surveys  
Traffic Survey Specialists

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## **Executive Summary**

The modern roundabout has been gaining popularity throughout the United States. This is primarily attributed to safety characteristics that traditional traffic control measures do not have. With fewer vehicle conflict points, the likelihood of crashes at a roundabout and the severity of those accidents are significantly reduced. There are also traffic operations and capacity advantages to the modern roundabout.

The potential benefits of the modern roundabouts are available at locations that are well suited to this type of intersection treatment. Roundabouts are not the answer for all traffic problems and at all locations. Therefore, it is important to determine whether or not a roundabout is the suitable solution for individual intersections.

The Lee County MPO Roundabout Feasibility Study analyzed the feasibility of installing roundabouts at 18 candidate locations throughout Lee County. The purpose of the study was to undertake an intersection analysis to determine the design year efficiency of roundabouts at the candidate locations. For those intersections where roundabouts were determined to be a viable option, conceptual geometric designs and cost estimates for each were developed, traffic simulations performed for two locations, and 30% design plans prepared for two locations.

The candidate locations are spread throughout Lee County. Twelve are within the City of Fort Myers, two in Lehigh Acres, two in Tice, one in the City of Sanibel, and one in Buckingham. All are existing intersections and will have to be retrofitted for a roundabout, if a roundabout is determined to be a viable option.

The Roundabout Study is comprised of eight major tasks.

- Initial “Fatal Flaw” Screening
- Traffic Data Collection & Traffic Projections
- Operational Analysis
- Geometric Conceptual Design
- Construction Cost Estimates
- Evaluation & Ranking
- Traffic Simulation
- 30% Design Plans

The first step in the Roundabout Study was the initial screening of the 18 intersections to identify possible “fatal flaws” before the detailed evaluation of each location takes place. Based on a review of the literature and a screening of the 18 locations, it was concluded that there does not appear to be any one criteria or combination of criteria that would definitively rule out a location from consideration for a roundabout. Rather, all locations should undergo a detailed evaluation. For example, while a roundabout location may have issues and constraints under the screening criteria based on vehicle flow, right-of-way and environmental issues, other benefits may make a roundabout feasible. Therefore, the initial review was most useful for identifying issues and possible constraints to be addressed during later evaluations and conceptual design, rather than eliminating locations from further evaluation.

The roundabout operational analysis and formulation of conceptual design plans were undertaken simultaneously in an iterative and coordinated process. The objective was to minimize construction costs, reduce right-of-way impacts, and maintain an acceptable level of service. In some cases, an initial roundabout concept was completed in compliance with design standards but the operational analysis revealed that additional turn lanes were required. Because of this, and other reasons, several roundabout options were analyzed for many of the locations.

The roundabout operational analysis was undertaken to evaluate the operational feasibility of installing roundabouts at each of the 18 locations. The operational analysis showed that all 18 intersections under study maintain an acceptable level of service for the overall intersection with a roundabout during the critical peak hours under existing and future traffic conditions, and, in most cases, a roundabout provided a better level of service compared to the traditional intersection.

Conceptual roundabout geometric layouts were developed for the 18 intersections following the design guidelines contained in NCHRP Report 672, Roundabouts, An Informational Guide, 2<sup>nd</sup> Edition, and Chapter 7 of the Florida Intersection Design Guide. The concept plans were prepared showing the roadway features and approximate right-of-way.

General construction cost estimates associated with the roundabout geometric concept plans were prepared for each location. Total construction costs included two components: construction and right-of-way. The total construction costs are conceptual planning level estimates only and represent order of magnitude estimates for comparative purposes. For example, the conceptual “mini” roundabout geometric concept plan for the intersection of **Dr. Martin Luther King Boulevard / Lee Street / Thompson Street (Location #7)** was determined to be the least expensive, while the geometric concept plan at **US 41 / McGregor Boulevard / Dr. Martin Luther King Boulevard (Location #10)** was determined to be the most expensive.

Following the operational analysis, preparation of geometric concept plans, and estimates of construction costs, the 18 proposed roundabouts were evaluated and ranked. A set of criteria, a weighting of those criteria, and an evaluation methodology were established to evaluate and rank the proposed roundabout concepts in order to prioritize projects for possible development and funding.

The top five roundabouts, as recommended by the Roundabout Steering Committee, the MPO’s TAC and CAC committees, and the MPO Board, and listed in the order of priority, included the following.

1. **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)**
  - Based on congestion concerns.
2. **Winkler Road / Challenger Boulevard (Location #11)**
  - Based on safety concerns.
3. **Buckingham Road / Gunnery Road (Location #2)**
  - Based on safety concerns.
4. **McGregor Boulevard / Colonial Boulevard (Location #12)**
  - Based on safety and congestion concerns.

## 5. Michigan Avenue Link / Marsh Avenue (Location #16)

- Based on sight distance and traffic calming concerns.

Two of the five priority locations were selected by the MPO Board for traffic simulation. Traffic simulation was undertaken for those two roundabout locations in an effort to better visualize and understand the roundabout operations. The two locations selected for traffic simulation were **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)**, which was selected because it was the top rated roundabout location, and **Colonial Boulevard / McGregor Boulevard (Location #12)**, which was selected because of its complicated geometrics.

While the traffic simulation was intended to provide a visualization of the roundabout operations, the simulations, in particular at the intersection of **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)**, resulted in additional recommendations to improve operations.

Two of the five priority locations were selected by the MPO Board for the preparation of 30% design plans and 30% design plans were prepared. The locations included **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)** and **Winkler Avenue / Challenger Boulevard (Location #11)**.

Preliminary 30% design plans were first prepared by DPA and then provided to Alternate Street Design, DPA's subconsultant, for "peer" review. The peer review was undertaken and detailed review comments provided. Those comments were reviewed by DPA and the preliminary 30% design plans revised to reflect the comments. The 30% design plans were then distributed to the Roundabout Steering Committee for member review. Comments were received from LeeTran (for the Winkler Road / Challenger Boulevard location) and from Alternate Street Design. Those comments have been recorded and will be addressed if, and when, the 30% design plans proceed towards final design.

Finally, the Lee County MPO Roundabout Study included extensive community involvement and multiple presentations to various organizations. A Roundabout Steering Committee was assembled to advise, oversee and review the progress of the study. It was comprised of representatives of the Lee County MPO, City of Fort Myers, City of Sanibel, FDOT, Lee County DOT, and LeeTran. The Roundabout Steering Committee played a critical role in guiding project outcomes and voicing the needs of various jurisdictions.

Meetings and presentations were held with the Roundabout Steering Committee, the City of Sanibel Public Works Department, the City of Fort Myers Public Works Department, the City of Fort Myers City Council, the MPO Citizen Advisory Committee, the MPO Technical Advisory Committee, and the MPO Board. In addition, to improve the safety characteristics of the roundabout designs, a meeting with representatives of the visually impaired community was held to gather opinions and recommendations to accommodate the area's most vulnerable pedestrians.

The final presentation to the Lee County MPO Board, which was held on February 17, 2017, summarized the findings and conclusions of the Roundabout Study. The presentation included an overview of the tasks completed to date, roundabout simulations, aerial drone footage, and the



30% design plans of the top two priority roundabout locations. Also, the Project team's engineers and planners were present during the meeting to address questions raised by the MPO Board members and the public. After the Project team addressed all questions and concerns, the MPO Board passed a motion to accept the final report.

## **1. Introduction**

This report summarizes the findings and conclusions of the Lee County MPO Roundabout Study. The study was undertaken to analyze the feasibility of installing roundabouts and determine the design year efficiency of roundabouts at 18 possible locations throughout Lee County, Exhibit 1. For those intersections where roundabouts were determined to be a viable option, conceptual geometric designs and cost estimates for each were developed.

The study locations are spread throughout Lee County, Exhibit 2. Twelve are in the City of Fort Myers, two are in Lehigh Acres, two in Tice, one in the City of Sanibel, and one in Buckingham. All locations are existing intersections and will have to be retrofitted for a roundabout, if a roundabout is determined to be a viable option. Currently, eight of the potential locations are under signal control. Many of the locations have multilane approaches leading into the intersection.

### **Scope of Services**

The MPO's scope of services consisted of the following.

- Task 1. Kick Off Meeting
- Task 2. Methodology for Screening Initial List of Intersections for Roundabout Feasibility Analysis
- Task 3. Traffic Data Collection
- Task 4. Roundabout Operational Analysis
- Task 5. Conceptual Design
- Task 6. Opinion of Probable Construction Costs
- Task 7. Evaluation and Ranking Proposed Roundabout Projects
- Task 8. Traffic Modeling and Simulation
- Task 9. Conduct Survey and Develop 30% Design Drawings
- Task 10. Literature Review
- Task 11. Public Involvement, Presentation and Preparation of Final Report

#### **Intersections Under Study**

1. Buckingham Rd. & Cemetery Rd.
2. Buckingham Rd. & Gunnery Rd.
3. Periwinkle Way & Lindgren Blvd.
4. Altamonte Ave. & West First St.
5. Edison Ave. & Broadway
6. McGregor Blvd. & Barcelona Ave.
7. MLK Jr. Blvd. & Lee St.
8. 1<sup>st</sup> St. (SR 80) & Seaboard St.
9. SR 80 & Joel Blvd.
10. US 41 / MLK Jr. Blvd. / McGregor Blvd.
11. Winkler Ave. & Challenger Blvd.
12. Colonial Blvd. & McGregor Blvd.
13. SR 80 / New York / Tice St.
14. Ortiz Ave. & Tice St.
15. Carrell Rd. & Broadway
16. Michigan Ave. Link & Marsh Ave.
17. McGregor Blvd. & Virginia Ave.

Under this scope of services, a consulting team retained by the MPO would undertake an intersection analysis to determine the design year operational efficiency of roundabouts at the candidate locations. For those intersections where roundabouts are determined to be a viable option, conceptual geometric designs and cost estimates for each would be developed.

## **Consulting Team**

The MPO Board selected the consulting team led by David Plummer & Associates, Inc. (DPA) to complete the study. The consulting team included well known firms that specialize in transportation planning and engineering with extensive experience related to roundabout design and local familiarity of the area.

Under the leadership of the MPO staff, the study team included the following.

David Plummer & Associates  
2149 McGregor Boulevard  
Fort Myers, FL 33901

E.F.Gaines Surveying Services  
5235 Ramsey Way, Suite 10  
Fort Myers, Florida 33907

Alternate Street Design  
1516 Plainfield Avenue  
Orange Park, FL 32073

Sanibel Surveys  
2410 Palm Ridge Road  
Sanibel, Florida 33957

Johnson Engineering  
2122 Johnson Street  
Fort Myers, FL 33901

Traffic Survey Specialists  
85 SE 4<sup>th</sup> Avenue  
Delray Beach, Florida 33483

## **Roundabout Steering Committee**

A Roundabout Steering Committee comprised of representatives of the Lee County MPO, City of Fort Myers, City of Sanibel, FDOT, Lee County DOT, and LeeTran was assembled to provide guidance and oversee and review the progress of the study. The Roundabout Steering Committee played a critical role in guiding the study outcome and expressing the needs of various jurisdictions.

## **Technical Reports**

The findings and conclusions of this study have been reported in great detail in a series of technical reports prepared by the consulting team and reviewed by the MPO staff and Roundabout Steering Committee. These technical reports are listed below.

1. Initial Screening, December 15, 2015
2. Crash Data Summary, January 25, 2016
3. Traffic Data Collection, March 22, 2016
4. Operational Analysis, May 26, 2016
5. Conceptual Design, May 26, 2016
6. Cost Estimates, May 26, 2016
7. Evaluation and Ranking, May 26, 2016
8. Traffic Modeling and Simulation, August 19, 2016
9. 30% Design Plans, December 15, 2016

The most essential information from these technical reports has been carried forward into this final report, with numerous references to the technical reports that are the source of the information. Further discussions and explanations may be found in the technical reports themselves.

### **Final Report**

This final report, titled Lee County MPO Roundabout Study, provides the overall findings and conclusions for the Lee County MPO Roundabout Study.

## Exhibit 1

### Potential Roundabout Locations

#	Intersection	Location	Ownership	Planned	Other Proposal	Comments	Traffic Control Type	Ultimate Improvements
1	Buckingham Ave @ Cemetary Rd	Buckingham	Lee County		X	Added at Jan 9, 2014 TAC Meeting	1 way stop (Cemetary)	
2	Buckingham Ave @ Gunnery Rd	Lehigh Acres	Lee County		X	Added at Jan 9, 2014 TAC Meeting	1 way stop (Gunnery)	
3	Periwinkle Way @ Lindgren	Sanibel	Sanibel		X	Added on Jan 7, 2015 at City of Sanibel Request	4 way stop	
4	Altamonte Ave @ West First Street	Fort Myers	Fort Myers	X		Project identified in Fort Myers Downtown Mobility Plan	2 way stop (Altamonte)	
5	Edison Ave @Broadway	Fort Myers	Fort Myers	X		Project identified in Fort Myers Downtown Mobility Plan	Traffic Signal	Edison to be widened from 2 to 4 from 41 to Fowler
6	McGregor Blvd @ Barcelona Ave	Fort Myers	Fort Myers	X		Project identified in City of Fort Myers Traffic Calming Plan	1 way stop (Barcelona)	
7	Lee St @ MLK Jr. Blvd	Fort Myers	FDOT	X		Project identified in Fort Myers Downtown Mobility Plan	Traffic Signal	
8	Seaboard St @ 1st St (SR 80)	Fort Myers	FDOT	X		Project identified in Fort Myers Downtown Mobility Plan	Traffic Signal	First Street to be reconstructed as two way street with sidewalks and bike lanes
9	Joel Blvd @ SR 80	Lehigh Acres	FDOT		X		Traffic Signal	Joel Blvd to be widened from 2 to 4 lanes from N of E 17th St to SR 80
10	US 41 Ramps @ MLK/Main St/McGregor	Fort Myers	FDOT	X		Project identified in Fort Myers 2010 Downtown Plan	Traffic Signal	
11	Winkler Ave Ext @ Challenger Blvd	Fort Myers	Fort Myers	X			2 way stop (Challenger)	
12	Colonial Blvd @ McGregor Blvd	Fort Myers	FDOT		X		Traffic Signal	
13	New York/Tice St @ SR 80	Tice	FDOT		X	Added at Jan 9, 2014 TAC Meeting	Traffic Signal	
14	Ortiz Ave @ Tice St	Tice	Lee County		X	Added at Jan 9, 2014 TAC Meeting	Traffic Signal	Ortiz to be either reconstructed as 2 lane facility with bike lanes and sidewalks, or widened to 4 lanes with bike ped facilities
15	Carrel Rd @ Broadway	Fort Myers	Fort Myers		X	Added at Feb 13, 2014 TMOC Meeting	Traffic Signal	
16	Michigan Ave Link @ Marsh Ave	Fort Myers	Fort Myers	X		Added at Feb 13, 2014 TMOC Meeting	1 way stop (Marsh)	
17	McGregor Blvd @ Virginia Ave	Fort Myers	Fort Myers	X		Added at City's Request on May 6, 2014	2 way stop (Challenger)	
18	Seaboard St @ 2nd St (SR 80)	Fort Myers	FDOT	X		Added at City's Request on May 6, 2014	2 way stop (Palm Ave/2nd St)	Second Street to be reconstructed as 2 or 4 lane with sidewalks and bike lanes



## **2. Initial Screening**

There are many potential benefits of installing a roundabout in lieu of a traffic signal or other traffic control devices. The modern roundabout has been gaining popularity throughout the United States. This is primarily attributed to safety characteristics that traditional traffic control measures do not have. With fewer vehicle conflict points, the likelihood of crashes at a roundabout and the severity of those accidents are significantly reduced. There are also traffic operations and capacity advantages to the modern roundabout.

The potential benefits of the modern roundabout will only be realized at locations that are well suited for this type of intersection treatment. Although roundabouts have proven to be a versatile tool used by engineers for decades, they are not necessarily the answer for all traffic problems and at all locations because under certain conditions, a roundabout may not be a realistic option. Therefore, it is important to determine whether or not a roundabout is the suitable solution for a proposed intersection improvement.

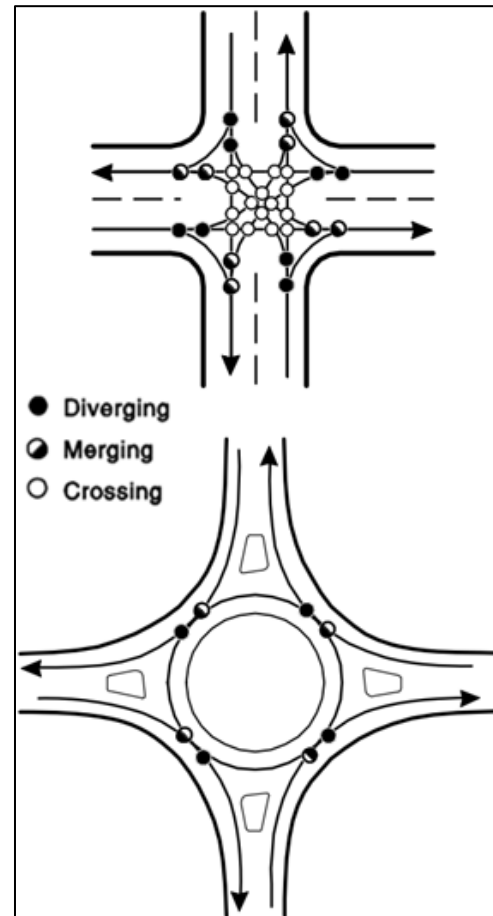
The first step in the Roundabout Study was the initial screening of the 18 intersections for possible “fatal flaws” before undertaking detailed evaluations. The report titled Lee County MPO Roundabout Study Initial Screening, and dated December 15, 2015, explains in detail the initial screening criteria, provides the methodology for screening the intersections and the conclusions of the initial screening.

### **Screening Criteria**

The Florida Intersection Design Guide 2015, NCHRP Report 672, Roundabouts: An Informational Guide, and reports and manuals from other jurisdictions were researched in order to identify screening criteria and establish an initial screening methodology. The intent was to establish a set of criteria and a methodology that can be measured consistently from location to location.

A “fatal flaw” is a condition or conditions that would most likely make it impossible, impractical or uneconomical to construct a roundabout at a particular location and would be inconsistent with the operation of a roundabout. Based on a review of the literature, there does not appear to be any one criteria or combination of criteria that would definitively rule out a location from consideration for a roundabout. Rather, additional detailed analyses and evaluations may reveal that the initial “fatal flaw” conditions can be overcome technically or from a cost / benefit

**Reduced Conflict Points & Accidents**



perspective. Therefore, the initial review or screening is most useful for identifying issues and possible constraints to be addressed during further evaluations and conceptual design.

The initial screening criteria are summarized below.

1. The major roadway AADT exceeds 90% of the total intersection AADT.
2. The total entering volumes exceed 45,000 AADT.
3. The total peak hour circulating flow is greater than 3,400 veh/hr and/or the entering/exiting volume at any entrance/exit is greater than 2,400 veh/hr.
4. The location is within a coordinated signal system.
5. A roundabout would have substantial and direct right-of-way impacts and impacts to industrial, commercial or residential buildings and facilities.
6. A roundabout would have substantial and direct impacts on historical, cultural, or archaeological sites.
7. A roundabout would have substantial and direct impacts on 4(f) sites, such as public parks, recreation lands, and wildlife and waterfowl refuge.
8. A roundabout would have immitigable environmental impacts, including substantial and direct impacts on socially significant trees that cannot be relocated.
9. The location has physical or geometric constraints that would limit visibility or impede construction.
  - a) Grades
  - b) Topography
  - c) Utility conflicts
  - d) Drainage impacts
10. The location has pedestrian constraints involving special needs pedestrian traffic.
11. The location has downstream conditions that cause traffic queues which could interfere with roundabout operations.

### **Screening Methodology**

There were three main phases involved in the initial screening of each intersection. The first phase was a general background investigation of the intersection to find the necessary information. The second phase was to plot the inscribed circle diameter onto an aerial map so that the spatial requirements can be estimated. The final phase was to complete the screening checklist, identify issues and constraints, and determine if the intersection is to proceed to further analysis.

Before the detailed screening process could take place, the site needed to undergo a general background investigation concerning both the intersection itself as well as the approaching roadways. This information included the number of approaches, right-of-way, utilities, adjacent land use, traffic volumes and the like.

To address the likely implications of a roundabout, the inscribed circle diameter for the roundabout was estimated. The inscribed circle diameter establishes the approximate size of a roundabout, with the edge of the circle representing the outer curb of the roadway. The Florida Intersection Design Guide 2015 recommends using the inscribed circle diameter to estimate the



footprint of a roundabout using an inscribed circle diameter of 160 feet for a one-lane roundabout and 200 feet for a two-lane roundabout. These dimensions are conservative and were used in analyzing most sites to estimate spatial impacts.

To facilitate the detailed screening process, a checklist was developed to provide a consistent assessment of each location, Exhibit 3.



### **Initial Screening**

Using the screening checklist, the 18 potential roundabout locations were screened against the criteria. Information used to conduct the screening process was primarily based on GIS databases, aerial mapping, site visits, the Lee County Traffic Count Report, Florida DOT Online Traffic Data, and 24-hour machine traffic counts.

Finally, all 18 sites were field reviewed by the DPA team. The field review included observations regarding all of the screening criteria with particular attention given to utilities, drainage, grades and topography, potential right-of-way impacts, and surrounding land uses, including parks, schools, community facilities, and institutions.

Base maps, used to undertake the initial screening, are provided in Appendix A.

The screening sheets were completed for each individual intersection and the results are summarized in Exhibit 4.

The conclusions of the initial screening are as follows.

1. There does not appear to be any one criteria or combination of criteria that would definitively rule out a location from consideration for a roundabout during the initial screening. For example, while a roundabout location may have issues and constraints under the screening criteria based on vehicle flow, right-of-way and environmental issues, other benefits may make a roundabout feasible. For instance, **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location 3)** has an issue with vehicle back-ups to the west and north. These back-ups, however, will exist for all forms of traffic control. A roundabout could potentially manage the back-ups better than other forms of traffic control, while providing improved operations and safety, especially outside of peak season conditions. Another issue not included in the initial screening is the possibility of a roundabout consolidating or simplifying a complex multiple approach intersection and providing improvements to pedestrians, bicycles and vehicles, such as **Dr. Martin Luther King Jr. Boulevard / Lee Street / Thompson Street (Location 7)** and **SR 80 / New York Drive / Tice Street (Location 13)**. Such benefits and considerations should be factors in the detailed evaluation of the “poorly performing roundabouts”. Furthermore, it is possible that some issues may be addressed using specific design treatments, such as altering the size and shape of the roundabout to

minimize spatial impacts. The initial review was most useful for identifying issues and possible constraints to be addressed during later evaluations and conceptual design. Therefore, all locations should be further evaluated in more detail.

2. Four intersections performed poorly under multiple criteria, raising issues and possible constraints as they moved forward in the study. The intersections include: **Dr. Martin Luther King Jr. Boulevard / Lee Street / Thompson Street (Location 7)**; **US 41 / Dr. Martin Luther King Jr. Boulevard / McGregor Boulevard / Main Street (Location 10)**; **SR 80 / New York Drive/ Tice Street (Location 13)**; and **McGregor Boulevard / Virginia Avenue (Location 17)**.
3. Based on this initial review, many intersections, if not all of them, have right-of-way impacts. Five intersections have clear right-of-way impacts, with some potentially having impacts on parking and buildings. The intersections include: **West First Street / Altamonte Avenue (Location 4)**; **Dr. Martin Luther King Jr. Boulevard / Lee Street / Thompson Street (Location 7)**; **SR 80 / First Street / Seaboard Street (Location 8)**; **SR 80 / New York Drive/ Tice Street (Location 13)**; and **McGregor Boulevard / Virginia Avenue (Location 17)**.
4. Three intersections exhibit downstream bottlenecks or traffic congestion that will impact the traffic operations at the subject intersection, including a roundabout. The intersections include: **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location 3)**; **US 41 / Dr. Martin Luther King Jr. Boulevard / McGregor Boulevard / Main Street (Location 10)**; and **McGregor Boulevard / Virginia Avenue (Location 17)**.



## Exhibit 3

### Initial Screening Checklist

Initial Screening Sheet	
<b>Intersection:</b>	<b>Date Prepared:</b>
<b>Location Description:</b>	
<b>Completed by:</b>	<b>Traffic Control:</b>
<b>Number of Approaches:</b>	<input type="checkbox"/> TWSC <input type="checkbox"/> AWSC <input type="checkbox"/> Signal <input type="checkbox"/> Other
<b>Major Road:</b>	<b>Number of Lanes:</b>
<b>Minor Road:</b>	<b>Number of Lanes:</b>

Summary of Screening Sheet		
Proceed to Further Evaluation? Justification:	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Screening Criteria		
Major Roadway AADT vs. Total Intersection AADT	<p>1. Does the major roadway AADT exceed 90% of the total intersection AADT?</p> <p style="margin-left: 20px;">Major Roadway AADT:</p> <p style="margin-left: 20px;">Total Intersection AADT:</p> <p style="margin-left: 20px;">%Total:</p> <p>Comments:</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Maximum Intersection Volume	<p>2. Does the intersection have a current AADT value greater than 45,000 AADT?</p> <p style="margin-left: 20px;">Major Roadway AADT:</p> <p style="margin-left: 20px;">Minor Roadway AADT:</p> <p style="margin-left: 20px;">Total Intersection AADT:</p> <p>Comments:</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Maximum Intersection Volume	<p>3. Does the intersection have an entering or exiting peak hour volume greater than 2,400 veh/hour and a circulating volume greater than 3,400 veh/hour?</p> <p style="margin-left: 20px;">Major Entering Roadway Peak Hour Volume:</p> <p style="margin-left: 20px;">Major Exiting Roadway Peak Hour Volume:</p> <p style="margin-left: 20px;">Estimated Circulating Peak Hour Volume:</p> <p>Comments:</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Proximity to Coordinated Signal Networks	<p>4. Is the intersection located within a coordinated signal network?</p> <p>Comments:</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
Industrial, Commercial, & Residential Impacts	<p>5. Would there be any clearly apparent substantial and direct right-of-way impacts and impacts to industrial, commercial, or residential buildings?</p> <p>Comments:</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No



Screening Criteria		
Historical, Cultural, & Archaeological Impacts	6. Would there be any clearly apparent substantial and direct impacts to historical, cultural, or archaeological sites? Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
4(f) Site Impacts	7. Would there be any clearly apparent substantial and direct impacts to any 4(f) sites? Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Immitagable Environmental Impacts	8. Would there be any clearly apparent immitagable environmental impacts, including substantial and direct impacts on socially significant trees? Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Physical or Geometric Constraints	9.a) Do any of the intersecting roads have grades greater than 3%? If yes, document the road(s), direction of approach, and grade: Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
	9.b) Can site topography clearly be considered unfavorable? Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
	9.c) Are there any clearly apparent significant utility conflicts? If yes, document the issue(s) along with the location: Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
	9.d) Are there any clearly apparent significant drainage impacts? Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Pedestrian with Special Needs	10. Are there any schools, retirement homes, parks, or institutions serving the blind within a quarter mile radius? If yes, document the location(s) and distance(s) away from the intersection: Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Downstream Traffic Queues	11. Are there any downstream traffic control devices, bottlenecks, or other conditions that cause clearly apparent queues extending into the subject locations? Comments:	<input type="checkbox"/> Yes <input type="checkbox"/> No

## Exhibit 4

### Initial Screening Summary

#### Screening Criteria

<u>Intersection</u>	<u>#1. Major Road AADT</u>	<u>#2. Total Int. AADT</u>	<u>#3. Peak Volume</u>	<u>#4. Signal System</u>	<u>#5. ROW Impacts</u>	<u>#6. Historic/Cultural</u>	<u>#7. 4(f) Sites</u>	<u>#8. Env. Impacts</u>	<u>#9.a) Grades</u>	<u>#9.b) Topography</u>	<u>#9.c) Utilities</u>	<u>#9.d) Drainage</u>	<u>#10. Parks/Schools</u>	<u>#11. Bottlenecks</u>
1. Buckingham Rd/ Cemetery Rd	No	No	No	No	<u>Potentially Yes</u>	<u>Potentially Yes</u>	<u>Potentially Yes</u>	No	No	No	No	No	<u>Yes</u>	No
2. Buckingham Rd/ Gunnery Rd	No	No	No	No	<u>Potentially Yes</u>	No	No	No	No	No	No	No	<u>Yes</u>	No
3. Periwinkle Way/ Causeway Blvd	No	No	No	No	No	No	No	No	No	No	No	No	No	<u>Yes</u>
4. West First St/ Altamonte Ave	No	No	No	No	<u>Yes</u>	No	No	No	No	No	No	No	No	No
5. Edison Ave/ Broadway	No	No	No	No	<u>Potentially Yes</u>	No	No	No	No	No	No	No	<u>Yes</u>	No
6. McGregor Blvd/ Barcelona Ave	<u>Potentially Yes</u>	No	No	No	<u>Potentially Yes</u>	No	No	No	No	No	No	No	No	No
7. MLK/ Lee St/ Thompson St	<u>Yes</u>	No	No	<u>Yes</u>	<u>Yes</u>	<u>Potentially Yes</u>	<u>Potentially Yes</u>	No	No	No	No	No	<u>Yes</u>	No
8. SR 80/ First/ Seaboard	No	No	No	No	<u>Yes</u>	No	No	No	No	No	No	No	<u>Yes</u>	No
9. SR 80/ Joel Blvd	No	No	No	No	No	No	No	No	No	No	No	No	No	No
10. US 41/ MLK/ McGregor Blvd	No	No	<u>Yes</u>	<u>Yes</u>	<u>Potentially Yes</u>	No	No	No	No	No	No	No	<u>Yes</u>	<u>Yes</u>
11. Winkler Rd/ Challenger Blvd	No	No	No	No	No	No	No	No	No	No	No	No	<u>Yes</u>	No
12. McGregor Blvd/ Colonial Blvd	No	No	No	<u>Yes</u>	<u>Potentially Yes</u>	<u>Potentially Yes</u>	<u>Potentially Yes</u>	No	No	No	No	No	<u>Yes</u>	<u>Potentially Yes</u>
13. SR 80/ New York/ Tice St	No	No	No	<u>Yes</u>	<u>Yes</u>	<u>Potentially Yes</u>	No	No	No	No	No	No	<u>Yes</u>	No
14. Ortiz Ave/ Tice St	No	No	No	No	No	No	No	No	No	No	No	No	<u>Yes</u>	No
15. Broadway/ Carrell Rd	No	No	No	No	<u>Potentially Yes</u>	No	No	No	No	No	No	<u>Yes</u>	<u>Yes</u>	No
16. Michigan Link/ Marsh Ave	No	No	No	No	<u>Potentially Yes</u>	No	No	No	No	No	No	No	<u>Yes</u>	No
17. McGregor Blvd/ Virginia Ave	<u>Potentially Yes</u>	No	No	No	<u>Yes</u>	No	No	No	No	No	No	No	<u>Yes</u>	<u>Yes</u>
18. SR 80/ Second St/ Seaboard	No	No	No	No	<u>Potentially Yes</u>	No	No	No	No	No	No	No	<u>Yes</u>	No

### **3. Traffic Data**

Existing and future forecasted traffic volumes were established for the study area intersections. Task 3. Traffic Data Collection of the study's scope of services specifies that existing approach counts were to be collected at the 18 intersections under study for a full day and turning movement counts collected at each location for the AM, Mid-Day, and PM peak hours. Traffic data collection also included vehicle classification counts and truck, golf cart, bicycle and pedestrian observations. Traffic volume growth factors were also developed and existing volumes projected to the study design year.

The report titled Lee County MPO Roundabout Study Traffic Data Collection and dated March 22, 2016 details the existing traffic data collection undertaken for the study and the projection of existing turning movement volumes to the study design year.

The type of traffic data collected for the study included 24-hour counts, vehicle classification counts, and turning movement counts.

Crash data was reviewed for the study area intersections. Original crash reports were obtained and reviewed for the 8 locations with the highest number of crashes. Those crashes potentially correctible by a roundabout were noted.

#### **Existing Traffic Count Data**

24-hour machine counts, recorded by 15-minute increments, were conducted at all approaches to 16 of the 18 study area intersections. Due to on-going construction activities, 24-hour machine counts could not be conducted at two locations: **McGregor Boulevard / Barcelona Avenue / Alcazar Avenue (Location #6)** and **Second Street / Seaboard Street / Palm Avenue (Location #18)**.

The daily volume from the 24-hour machine counts were adjusted to represent Annual Average Daily Traffic (AADT), using the adjustment factors reported in the Lee County 2014 Traffic Count Report. The counts were also adjusted to peak hour, peak season using the adjustment factors from the Lee County 2014 Traffic Count Report.

Coincident with the 24-hour machine counts, vehicle classification counts were conducted at 16 of the study intersections. This allowed a classification of vehicles into motorcycle, auto, pickup / van, 2-axle single unit trucks, and 3 or more axle trucks.

While 24-hour machine counts were not conducted at two locations, peak hour turning movement counts were conducted at all locations. The raw turning movement counts were seasonally adjusted to represent peak season, peak hour volumes using the peak season conversion factors from the Lee County 2014 Traffic Count Report.

Coincident with the intersection turning movement counts, bicycle, pedestrian, golf cart and truck traffic observations were made.

The traffic data was reviewed for accuracy, with accuracy measured as a deviation of approach counts and peak hour volumes of 10%. The machine counts and turning movement counts for those locations and peak hours not within the 10% deviation were reviewed and adjusted to bring each location and peak hour within the identified range.

The adjusted existing (2015) AM, Mid-Day, and PM peak hour turning movement counts are shown in Appendix B.

### **Project Design Year Traffic Volumes**

Existing traffic volumes at the study area intersections were forecasted to the year study design year of 2040. The Lee County MPO requested that the design year reflect 2040 traffic volumes, rather than year 2035 as specified in the scope of services. Year 2040 was considered appropriate given that the MPO's recently adopted Long Range Transportation Plan, and the travel model used to develop the Plan, reflected year 2040.

Existing peak hour turning movement volumes for the 18 locations under study were forecasted to the design year using combinations of traffic volume growth factors, the Lee County travel model, and other available traffic studies.

In most instances, future 2040 traffic volumes were established using historic growth trends, derived from the Florida DOT Florida Traffic Information Online database and / or the Lee County traffic count reports. These were checked for reasonableness using the Lee County MPO travel model volumes under the 2040 Cost Feasible Plan.

In three locations, volumes were further adjusted to reflect the introduction of significant roadway improvements, including the Edison Avenue Extension from US 41 to McGregor Boulevard at Virginia Avenue and the conversion of First Street and Second Street in the City of Fort Myers from one-way traffic to two-way traffic.

Future 2040 peak hour traffic volumes at the intersections under study are depicted in Appendix B.

### **Crash Data**

The Lee County MPO provided crash data for all 18 locations in order to identify the locations with crash problems and whether or not the crashes may be correctible with a roundabout. The initial crash summaries were reviewed. 10 intersections were found to have relatively low numbers of crashes, while 8 were found to have moderate to high number of crashes.

The 8 intersections that were found to have a moderate to high number of crashes included the following.

**Moderate to High Crash Locations**

<b><u>Intersection</u></b>	<b><u>Crashes</u></b>
Location 2. Buckingham Road / Gunnery Road	17
Location 7. MLK Jr. Boulevard / Lee Street / Thompson	16
Location 9. SR 80 / Joel Boulevard	40
Location 10. US 41 / MLK Jr / McGregor Boulevard	46
Location 11. Winkler Avenue / Challenger Boulevard	29
Location 12. McGregor Boulevard / Colonial Boulevard	46
Location 13. SR 80 / New York / Tice Street	21
Location 14. Ortiz Avenue / Tice Street	14

The original crash reports and diagrams were obtained and reviewed for these 8 locations. Crashes were summarized by direction, type and severity and those potentially correctible by a roundabout noted.

The crash information for the study locations is detailed and summarized in the report titled Lee County MPO Roundabout Study Crash Data Summary and dated January 25, 2016.



#### **4. Roundabout Operational Analysis**

A detailed operational analysis, consistent with Task 4. Roundabout Operational Analysis of the study's scope of services, was undertaken to evaluate the feasibility of installing roundabouts at each of the 18 locations. The evaluation included an operational analysis of the existing intersection geometry and a roundabout alternative under existing and future traffic volumes. For those intersections that failed under future traffic volumes, improvements necessary to maintain acceptable levels-of-service at the intersection reflective of a traditional intersection and a roundabout alternative were identified.

The report titled Lee County MPO Roundabout Study Operational Analysis and dated May 26, 2016 details the operational analyses undertaken for each of the 18 locations under study.

#### **Traffic Analysis Software**

Synchro 9 was used to analyze the traditional intersections under existing (2015) and future conditions (2040). The roundabout alternatives were analyzed using SIDRA Intersection (Version 6.1).

Where available, analysis based upon the HCM methodology was relied on. For certain locations, the traditional intersection could not be analyzed using HCM methodology due to limitations, such as having more than 4 approaches. In these cases, output based upon Synchro methodology was used as a substitution to provide data for evaluation purposes.

#### **Traffic Data**

For the analysis of all scenarios, traffic volume inputs were based on those developed from Task 3 of this study. This included existing turning movement volumes (2015) and project design year traffic volumes (2040) for the AM, Mid-day, and PM peak hours. Peak hour factors and heavy vehicle percentages were derived from traffic counts and were held constant for all traffic analysis.

Of the study locations, 8 are currently signalized intersections. Lee County DOT provided the signal timing plans for these intersections and identified, if applicable, the appropriate split patterns for each peak hour.

The Lee County MPO provided crash data for all 18 locations in order to identify the locations with crash problems and whether or not the crashes may be correctible with a roundabout. The crash information for the study locations is detailed and summarized in the report titled Lee County MPO Roundabout Study Crash Data Summary and dated January 25, 2016.

#### **Analysis Scenarios**

The following scenarios were evaluated in the operational analysis.

- Existing Intersection Geometry with Existing (2015) Traffic Volumes

- Existing Intersection Geometry with Design Year (2040) Traffic Volumes
- Roundabout with Existing (2015) Traffic Volumes
- Roundabout with Design Year (2040) Traffic Volumes
- Traditional Intersection Improvement with Design Year (2040) Traffic Volumes

Existing Intersection Geometry, 2015 and 2040 Traffic Volumes:

The existing geometry was analyzed with 2015 and 2040 traffic volumes for the AM, Mid-day, and PM peak hours. The existing geometrics for **Palm Beach Boulevard / Seaboard Street (Location #8)** and **Second Street / Palm Avenue (Location #18)** were not analyzed under 2040 volumes since the conversion of First Street, Second Street, and Seaboard Street from one-way traffic to two-way traffic makes the existing geometric scenario not applicable.

Roundabout Alternative, 2015 and 2040 Traffic Volumes:

The roundabout operational analyses and formulation of conceptual designs were undertaken simultaneously in an iterative and coordinated process. The objective was to minimize construction costs, reduce right-of-way impacts, and maintain an acceptable level of service. In some cases, an initial roundabout concept was completed in compliance with design standards but the operational analysis revealed that additional turn lanes were required. Because of this, as well as other reasons, several roundabout options were analyzed for many of the locations.

The results of the operational analysis reflect the preferred roundabout concept, which are presented in the report titled Lee County MPO Roundabout Study Conceptual Design and dated May 26, 2016. The preferred roundabout conceptual designs are shown in Appendix C.

The preferred roundabout design concepts were analyzed with 2015 and 2040 traffic for the AM, Mid-day, and PM peak hours. **Palm Beach Boulevard / Seaboard Street (Location #8)** and **Second Street / Palm Avenue (Location #18)** were not analyzed under 2015 volumes since the conversion of First Street, Second Street, and Seaboard Street makes the scenario not applicable.

Traditional Intersection Improvement, 2040 Traffic Volumes:

If the traditional intersection reflective of existing geometrics failed under future 2040 traffic volumes, intersection improvements were tested in an effort to achieve the level of service standard for the intersection.

The improvements varied by study location and included signalization, signal retiming, adding turn and through lanes to accommodate critical movements, and eliminating approaches on 5-legged intersections.

The traditional improvements were analyzed with 2040 traffic for the AM, Mid-day, and PM peak hours. Due to the complexity of two of the intersections, no major improvements were analyzed for **US 41 / McGregor Boulevard / MLK Boulevard / Main Street (Location #10)** and **McGregor Boulevard / Colonial Boulevard (Location #12)**.

## **Summary of Results**

The operational analysis for each scenario by intersection was summarized in order to highlight the operational performance, reflecting factors such as overall level of service, intersection delay, queue length, and volume to capacity ratio. The operational summary for each intersection is presented in Appendix D and summarized in the following.

### **Location #1. Buckingham Road / Cemetery Road:**

This intersection is located in Lehigh Acres, has little congestion under existing conditions and few reported accidents. However, Lehigh Acres is expected to continue to grow and the intersection expected to experience congestion under future traffic conditions with the current intersection configuration.



The preferred roundabout design features a single lane roundabout incorporating turn lanes on each approach. The right turn lane on Cemetery Road is channelized to accommodate heavy right turning movements heading northbound on Buckingham Road. The roundabout, under 2040 traffic volumes, is projected to operate at good LOS during the critical peak hour.

The traditional intersection improvement for this location would be to install a traffic signal and turn lanes, including southbound dual left turn lanes, a westbound free-flow right turn lane, and a northbound right turn lane. During the critical peak hour, the signalized intersection operates at a good LOS. Overall, the intersection is improved with the roundabout option and provides a better level of service than the signalized alternative.

### **Location #2. Buckingham Road / Gunnery Road:**

This intersection is characterized by a significant skewed angle, awkward geometric configuration, and a high number of reported accidents (mostly rear-ends on northbound Gunnery Road). The intersection has little congestion under existing traffic volumes but will experience congestion under future traffic conditions.

Over half of the reported crashes at this intersection appear to be rear end collisions occurring at the stop sign on Gunnery Road. Another significant portion of the accidents was left-turning conflicts from Gunnery Road onto Buckingham Road. The accidents appeared to be associated with the angle of the intersection. A roundabout would correct this and make it safer for drivers traveling through the intersection.

A single lane roundabout operates at a high level of service under existing traffic and during the critical peak hour in the design year. A roundabout reduces driver delay, while correcting the intersection geometrics.



Installing a traffic signal with exclusive left turn lanes on Gunnery Road and Buckingham Road results in reduced LOS in the AM and PM peak hours under 2040 traffic volumes. This is primarily due to heavy right turn volumes from Gunnery Road. To accommodate these right turning movements and improve LOS, additional improvements would have to be made to the intersection.

Location #3. Periwinkle Way / Causeway Boulevard / Lindgren Boulevard:

Due to southbound to westbound right turns in the AM peak hour and eastbound to northbound left turns in the PM peak hour, there is significant congestion at this intersection under existing and future conditions. The intersection currently operates at reduced LOS in the peak hour. Due to congestion, this four-way stop controlled intersection is manually controlled by the Sanibel Police Department during peak season.



The operational analysis shows that the roundabout performed at a high LOS under existing and future traffic conditions. The roundabout, in isolation, shows significant improvement when compared to the traditional four-way stop intersection. However, it is important to recognize that the intersection is influenced by external factors not reflected in the intersection analysis. These external factors include: congestion on Periwinkle Way in the westbound direction that, at times, can queue into the intersection; Periwinkle Way eastbound which, due to congestion, cannot deliver enough volumes into the intersection to allow the roundabout to operate at maximum efficiency; and Causeway Boulevard in the northbound direction which, due to the merge condition, can experience some back-up.

Traditional intersection improvements include signalization and installing dual eastbound left turn lanes. However, a signal is contrary the City of Sanibel's policies.

Location #4. West First Street / Altamonte Avenue:

The existing intersection experiences little congestion under 2015 and 2040 traffic conditions. A single lane roundabout is projected to operate at a high LOS under 2040 traffic volumes. The roundabout reduces future delay and queuing when compared to the unsignalized intersection and with the intersection signalized.



Location #5. Edison Avenue / Broadway:

The intersection is not congested under existing conditions. However, it is located in a potential redevelopment area and Edison Avenue is planned to be improved and become a future by-pass roadway. Future congestion will cause the existing intersection to fail.

A single lane roundabout with turn lanes improves the overall intersection level of service compared to the traditional intersection. Adding right turn lanes to the existing intersection configuration improves the performance of the intersection, but not as good as the roundabout.



Edison Avenue is planned to be widened to four lanes from US 41 to Fowler Street. Therefore,

depending on the timing of that four-laning, a two-lane Edison Avenue roundabout would substitute for a single lane roundabout with turn lanes.

Location #6. McGregor Boulevard / Barcelona Avenue / Alcazar Avenue:

There is little overall congestion at this intersection under existing and future traffic conditions. However, the side street left turns and thru movements experience significant delay due to heavy volumes and lack of gaps on McGregor Boulevard. A single lane roundabout operates at a good level of service under 2015 and 2040 traffic conditions. The traffic calming benefits of this roundabout would significantly improve pedestrian crossings of McGregor Boulevard and help bring the two neighborhoods together.



Signalizing the intersection at McGregor Boulevard and Alcazar Avenue improves side street delay but would significantly increase queuing on McGregor Boulevard.

Location #7. MLK Boulevard / Lee Street/ Thompson Street:

Source: Google

The intersection experiences congestion under future traffic conditions. Improvements are limited due to right-of-way constraints.

To minimize impacts, a “mini” roundabout is the preferred roundabout configuration. The roundabout replaces the existing signal, and reduces delay and queuing when compared to the existing intersection geometrics. The “mini” roundabout also includes the closure of Thompson Street and relocates it to the east on MLK Boulevard as a right-in / right out access. Closure of the Thompson Street approach will likely result in circuitous access to those uses on Thompson Street east of Lee Street.



Source: Google

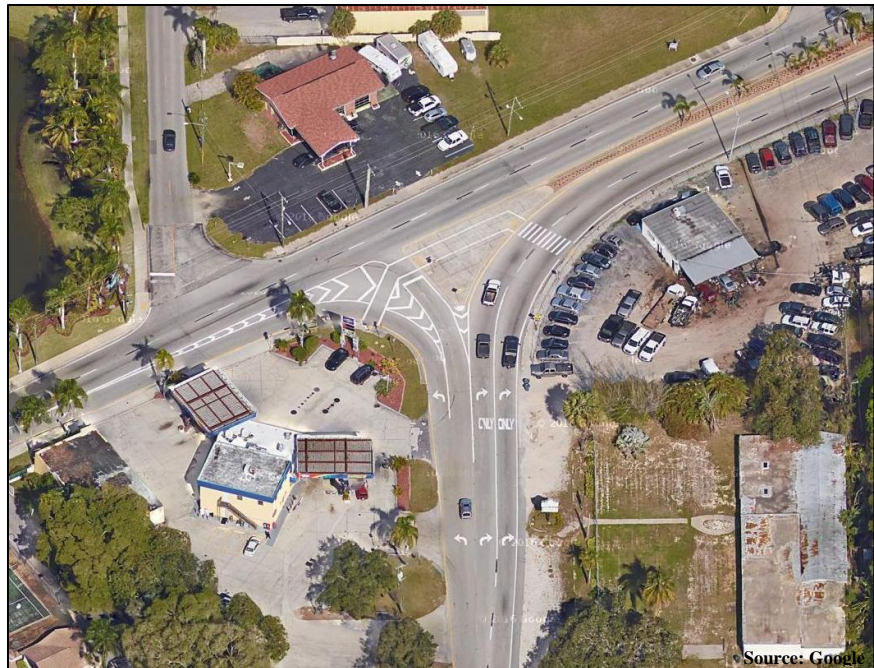
An option to improve the traditional intersection is to retain the signal and close off the Thompson Street approach. This removes an exclusive phase from the signal control, thereby reducing lost time, delay, and queuing for the

intersection. This improvement appears to result in level of service, delay, and V/C ratios comparable or better than the “mini” roundabout.

The majority of accidents at this location (75%) appear to be rear end crashes occurring on MLK Boulevard in both the eastbound and westbound directions. These crashes appear to occur either when the signal is red for the thru movement or when traffic slows down. Due to the type of crash and lack of apparent cause, the implementation of a roundabout could reduce a number of these crashes due to the forced speed reduction on the approaches.

Location #8. Palm Beach Boulevard / Seaboard Street / First Street:

This intersection is the eastern terminus of the First Street / Second Street / Seaboard Street one-way pair. It experiences little congestion under existing traffic conditions and under the one-way street system. Under future conditions, with the one-way streets converted to two-way, the intersection experiences congestion. In 2040, it is projected that there will be a very heavy westbound to southbound left turn movement in the AM peak hour and a heavy northbound to eastbound right turn movement in the PM peak hour.



The two way conversion will warrant the installation of a signal. However, the PM peak hour traffic causes the intersection to fail in 2040. In comparison, the roundabout is projected to operate at improved LOS during the AM, Mid-day and PM peak hours. The roundabout reduces delay and queuing for the intersection.

This intersection had a moderate number of reported accidents. A possible crash pattern appears to be vehicles traveling westbound on Palm Beach Boulevard weaving left to access the gas station west of Seaboard Street and conflicting with northbound to westbound merging traffic.

The roundabout, along with the conversion to two-way operations, will potentially correct many of the accidents reported at this intersection.

Location #9. SR 80 / Joel Boulevard:

Located in Lehigh Acres, this intersection has little congestion under existing conditions. It serves as a gateway for Lehigh Acres and is expected to experience significant congestion under future traffic conditions. There are heavy northbound to westbound left turning movements in the AM peak hour and eastbound to southbound right turning movements in the PM peak hour.



The intersection is projected to fail under future 2040 traffic conditions under its current configuration. A signal with added turn lanes improves level of service, but a roundabout is projected to operate at improved LOS, delay and queue. A two-lane roundabout on SR 80 with an eastbound right turn lane and two lanes on northbound Joel Boulevard operates at a high LOS in the critical AM peak hour and reduces delay and queuing.

The intersection has a significant number of accidents. Many of the collisions (40%) appear to be attributed to left turning movements failing to yield to opposing thru traffic. The roundabout would potentially eliminate these types of crashes.

Location #10. US 41 / MLK Boulevard / McGregor Boulevard:

This is a very busy intersection with significant congestion under existing and future traffic volumes. The implementation of the proposed roundabout will improve operations when compared to existing geometrics. The overall intersection level of service in the critical AM peak hour is projected to be LOS D in 2040. However, the V/C ratio on the worst approach is 1.49 under projected 2040 conditions, which may exceed the capacity of the adjacent intersection.



External factors at this location will have to be addressed. Those factors include southbound traffic backing up from the intersection at Victoria Avenue and US 41 into the roundabout and eastbound queues resulting from the pedestrian crosswalk at the Justice Center.

Traditional intersection improvements are limited due to right-of-way and building impacts. In addition, southbound US 41 may eventually be grade separated to match the northbound lanes.



If the southbound thru movements are grade separated, the roundabout would have to be adjusted in the future.

This 5-legged intersection has a high number of reported accidents. Many movements are illegal, but some drivers don't notice or ignore the signs resulting in accidents. The roundabout would potentially eliminate many of these types of crashes.

Location #11. Winkler Avenue / Challenger Boulevard:

There is little congestion at this intersection under existing conditions. However, it is located in a growing area and is projected to become congested in the future. Under future traffic conditions, there are anticipated to be heavy westbound to northbound right turning movements.



A two-lane roundabout operates at very good levels of service under future traffic conditions.

However, a two lane roundabout may be excessive under 2015 traffic volumes. Considerations can be given to designing and building a two-lane roundabout and operating it as a single lane roundabout until traffic volumes warrant two lanes.

The improvement to the traditional intersection would be a signal installation. The existing intersection with a traffic signal fails with 2040 traffic volumes. Installing an exclusive right turn lane to accommodate the heavy right turning movements is not enough to prevent the signal from operationally failing. Therefore, additional improvements would be necessary.

Many accidents have been reported at this location. Nearly 75% of crashes appear to be the result of drivers on Challenger Boulevard not yielding right of way to thru traffic on Winkler Avenue. Challenger Boulevard is controlled by a stop sign while Winkler Avenue is not. These types of crashes are eliminated by the roundabout.

Location #12. Colonial Boulevard / McGregor Boulevard:

This is a complicated, congested intersection. Due to heavy northbound and southbound traffic, there is significant queuing associated with these movements.

The rectangular roundabout improves LOS and significantly reduces delay and queuing compared to the existing intersection configuration. It is expected that the roundabout will operate at better than the LOS standard under 2040 traffic conditions.



Traditional improvements to the intersection, short of adding thru lanes, appear to be few.

There are a high number of accidents reported at this intersection, mostly rear end collisions on McGregor Boulevard. Some of these accidents may potentially be corrected with the roundabout.

Location #13. SR 80 / New York Drive / Tice Street:

This is a complicated, 5 legged intersection that experiences congestion under existing and future traffic conditions.

The preferred roundabout results in significant improvement to level of service, delay, and V/C ratios, while allowing full access to all side streets. Under 2040 traffic conditions, the roundabout operates at a high LOS for all peak hours.



To improve the traditional intersection, without impacting buildings, New York Drive would be closed for traffic entering the intersection. This eliminates an approach to the intersection and reduces delay, especially for the PM peak hour. However, the roundabout performs better than the traditional intersection.

A moderate number of accidents have been reported at this intersection, with some potentially correctible with a roundabout.

Location #14. Ortiz Avenue / Tice Street:

There is little congestion at this location under existing traffic conditions. However, there will be congestion in 2040 under the current intersection configuration.

A single lane roundabout with a right turn lane on the northbound and westbound approaches improves operations in 2040. The roundabout operates at a high LOS during the peak hours.

Improving the traditional intersection, with additional turn lanes on Tice Street, results in a high LOS during the peak hours in 2040. However, delay and queue are greater when compared to the roundabout.

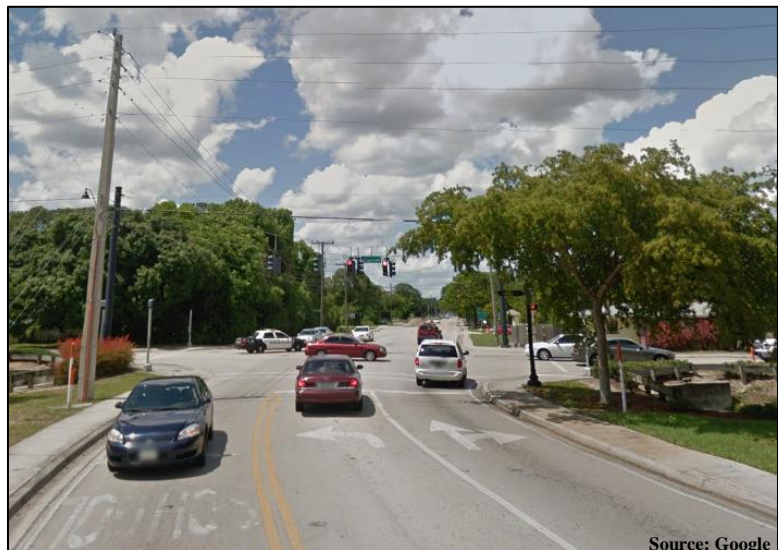


There are a moderate number of accidents at the location with a number of head-on and left turn crashes, which would be eliminated by a roundabout. Some of the other crashes are potentially correctible with a roundabout.

Location #15. Carrell Road/ Broadway:

The intersection does not experience congestion under existing or future traffic volumes. The single lane roundabout operates at a high LOS during peak hours under 2015 and 2040 traffic volumes. The signalized intersection is also projected to operate at a high LOS in 2040 with no improvements other than signal retiming.

There are few accidents reported at this intersection. However, due to the types of crashes, many of them are potentially correctible with a roundabout.



Location #16. Michigan Avenue Link / Marsh Avenue:

The intersection does not experience congestion under existing or future traffic conditions.

However, the side streets experience more queuing and delay as thru traffic increases over time.

A single lane roundabout performs well under existing and future traffic volumes and operates at a high LOS during the peak hours in 2040.

Signalizing the intersection results in a level of service that is comparable to that provided by the roundabout.



There are few accidents reported at this location. However, the City of Fort Myers has expressed concern for sight distance issues and speeding at this intersection. The installation of a roundabout will potentially improve sight distance and act as a traffic calming measure.

Location #17. McGregor Boulevard / Virginia Avenue:

There is little congestion at this intersection under existing conditions. However, due to developments approved in the area and the extension of Edison Avenue from US 41 to McGregor Boulevard, the intersection is expected to experience congestion in the future under 2040 traffic volumes. The side streets experience delay and queuing under existing conditions and this will intensify thru 2040.

A single lane roundabout will reduce delay and queuing and is projected to operate at a high LOS under 2040 traffic volumes.

Signalizing the intersection will improve overall level of service. During the PM peak hour, which is the critical peak hour, the signal will operate at better than the LOS standard in 2040 but with significant side street delay and queue.

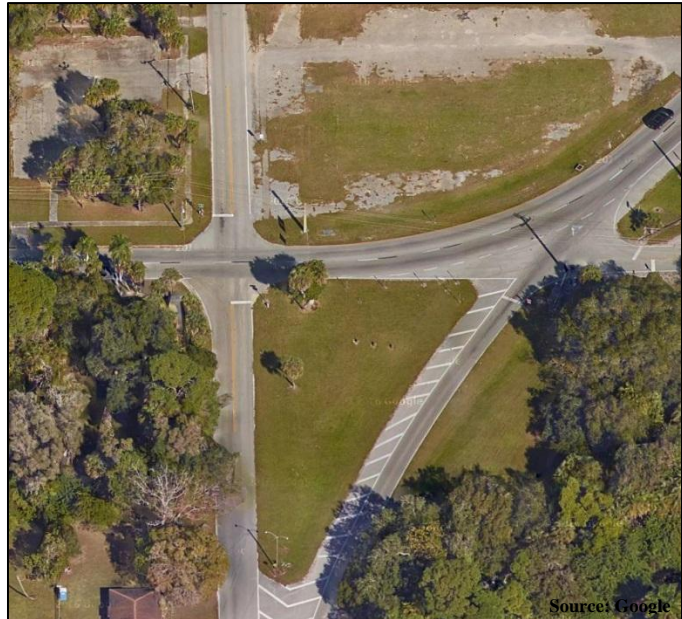


External factors will influence the operational performance of the intersection. Pedestrian movements at a signalized pedestrian crossing downstream at the Edison Home can, at times, queue westbound traffic into the Virginia Avenue intersection. This condition will have to be addressed in conjunction with the roundabout installation to ensure optimal performance.

There are few reported accidents at this location.

Location #18. Second Street / Seaboard / Palm Avenue:

This intersection is part of the First Street / Second Street / Seaboard Street one-way pair. Little congestion is experienced at this intersection under existing traffic volumes, on the one-way street system, and future traffic on a two-way street system. The two-way street system conversion will incorporate a traffic signal at Palm Avenue / Second Street. The signalized intersection is projected to operate at a good LOS.



The preferred roundabout option is a single lane roundabout with an eastbound right turn lane and a northbound left turn lane. The roundabout will bring Second Street, Palm Avenue, and Seaboard Street together to form a 5 legged intersection. The roundabout is projected to operate at a high LOS during 2040 peak hours.

## **5. Conceptual Design**

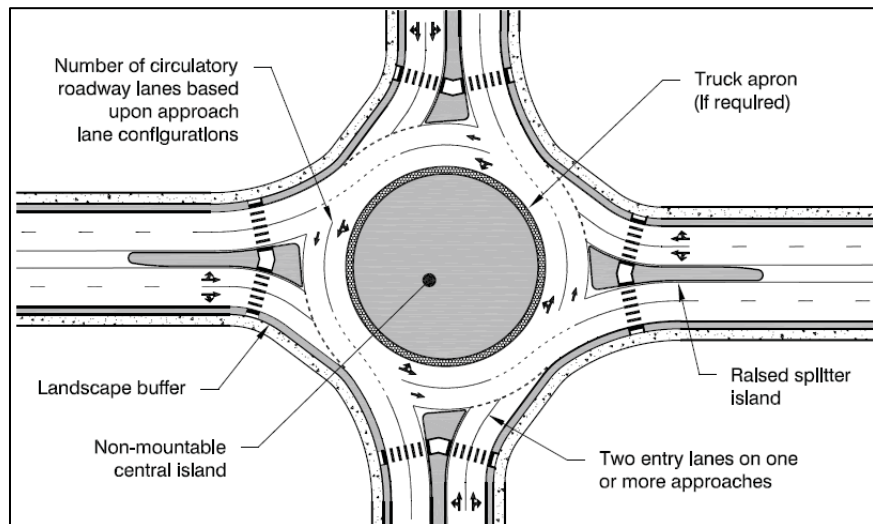
The report titled Lee County MPO Roundabout Study Conceptual Design and dated May 26, 2016 summarizes the development of conceptual roundabout designs at the 18 intersections under study. Task 5. Conceptual Design of the study's scope of services specifies that conceptual roundabout layout designs will be prepared for those intersections from Task 4. Roundabout Operational Analysis determined to be viable options based on the results of the roundabout operational analyses. The conceptual roundabout designs will be used in doing a conceptual level evaluation of potential impacts resulting from the proposed roundabout at each location.

### **Design Considerations**

General utility information within the general vicinity of the roundabout was obtained from the Lee County database and the individual utility companies. Right-of-way information was obtained from the Lee County Property Appraiser's data base. Field visits were performed, and existing features, approximate locations of utilities, roadway characteristics, and traffic control devices within the general footprint of the proposed roundabouts were identified. The desired design vehicle for each intersection was established.

Conceptual roundabout layouts were prepared on raster images showing the roadway features and approximate right-of-way. The conceptual roundabout layouts were developed following the design guidelines contained in NCHRP Report 672, Roundabouts, An Informational Guide, 2<sup>nd</sup> Edition, and Chapter 7 of the Florida Intersection Design Guide.

**Features of a Typical Two-Lane Roundabout. Source: NCHRP 672**



At intersections located within the limits of planned roadway projects, the conceptual roundabout layouts were developed so that the planned improvements could be accommodated.

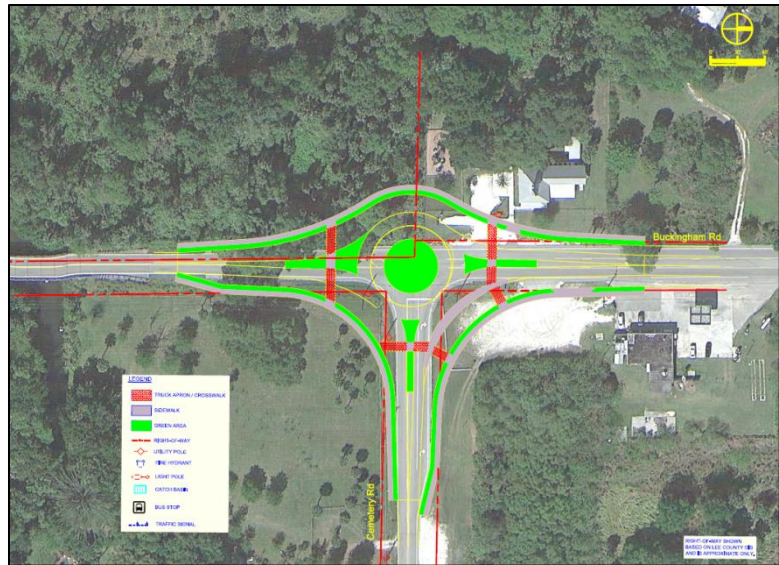
### **Conceptual Design Plans**

A summary of the design criteria and features, right-of-way considerations, accommodation of transit and bicycle facilities, and general drainage and utility impacts for each roundabout is provided below.

Roundabout conceptual design plans for each intersection are included in Appendix C.

Location #1. Buckingham Road / Cemetery Road:

This conceptual roundabout is a single-lane roundabout with a westbound right turn lane, a southbound left turn lane, and a northbound right turn lane to accommodate projected 2040 volumes. It was developed to accommodate WB-62 design vehicles for both Buckingham Road and Cemetery Road. Provisions have been made in the conceptual design to provide sufficient width within the circulatory roadway for the simultaneous passage of a semitrailer in combination with a passenger or single unit vehicle. These included proper selection of the inscribed circle diameter and width of truck apron. Fastest paths for this roundabout are within design guideline recommendations.

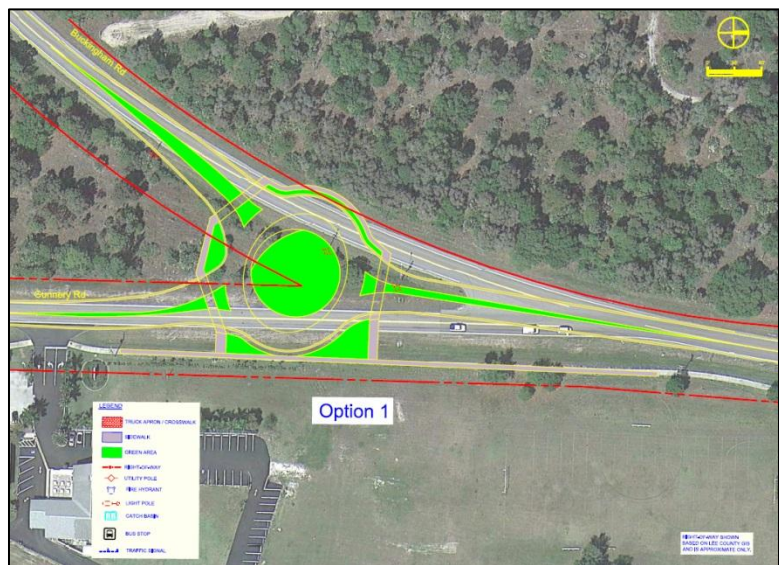


This location will require relocation of several utility poles. Drainage impacts are anticipated to be minor. The conceptual roundabout will have right-of-way impacts, including impacts on a parking lot for a cultural facility located in the northwest quadrant. Shifting the roundabout to the south to reduce right-of-way impacts on this facility, moves the roundabout closer to a bridge structure.

Location #2. Buckingham Road / Gunnery Road:

The conceptual roundabout is a single-lane roundabout. It was developed to accommodate WB-62 design vehicles for all movements except the acute right turn from the southwest to the south, which was designed to accommodate single unit trucks. Large trucks can also make this right turn by going around the roundabout.

Landscaping of this roundabout will be important to provide long range visibility of the roundabout. For night time visibility, up-



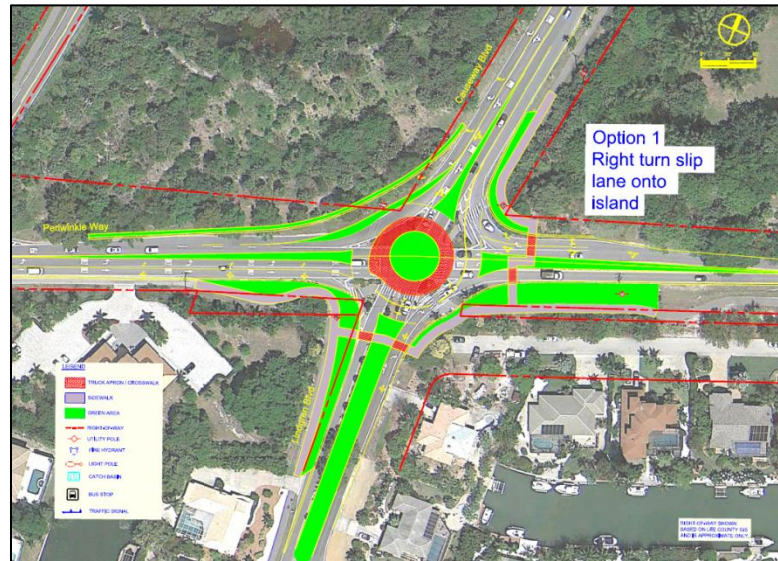
lighting is recommended. Fastest paths are within design guideline recommendations.

Pedestrian crossings tie into the existing sidewalk on the east side of Gunnery Road. Right-of-way impacts are confined to the south quadrant. Drainage and utility impacts are anticipated to be minor.

Location #3. Periwinkle Way / Causeway Boulevard / Lindgren Boulevard:

The conceptual roundabout consists of two eastbound lanes, with a left turn lane and a combination left/thru/right turn lane; two westbound lanes, with a right turn lane and a combination thru/left turn lane; two southbound lanes, with one thru/left and one free flow right turn lane; and one northbound lane.

This conceptual roundabout was developed to accommodate WB-62 design vehicles for all movements.



There are relatively minor right-of-way impacts, with the impacts on public lands. Drainage and utility impacts are anticipated to be minor.

Pedestrian crossings tie into the existing or relocated sidewalk paths. There are no pedestrian crossings shown on the north and west approaches due to the desire to discourage pedestrian crossings on those approaches.

Fastest paths are within design guideline recommendations.

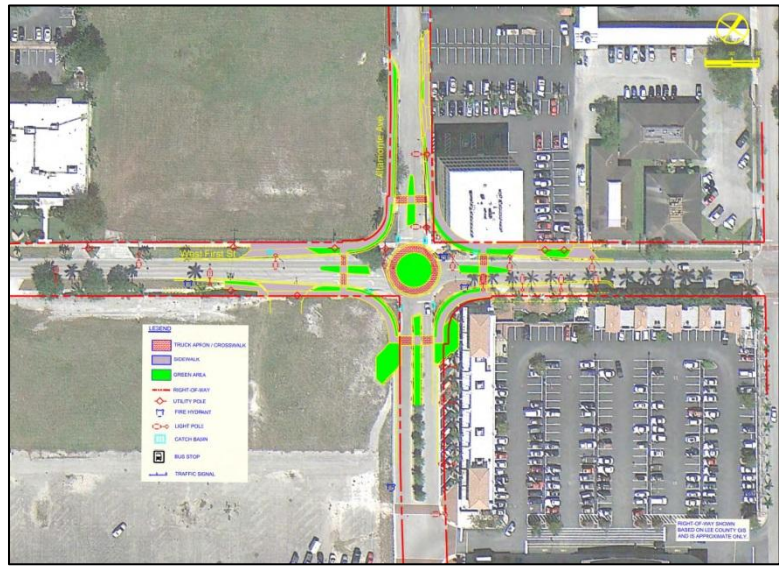
Location #4. West First Street / Altamonte Avenue:

This conceptual roundabout is a single-lane roundabout. It was developed to accommodate WB-50 design vehicles for both West First Street and Altamonte Avenue. The roundabout has significant right-of-way impacts, including a major impact to the office building in the northeast quadrant. Fastest paths for this roundabout are within design guideline recommendations.



Altamonte Avenue and West First Street are bike-friendly streets. A minimum 10-foot sidewalk is being provided at this roundabout for cyclists who may not feel comfortable traversing the roundabout like other vehicles.

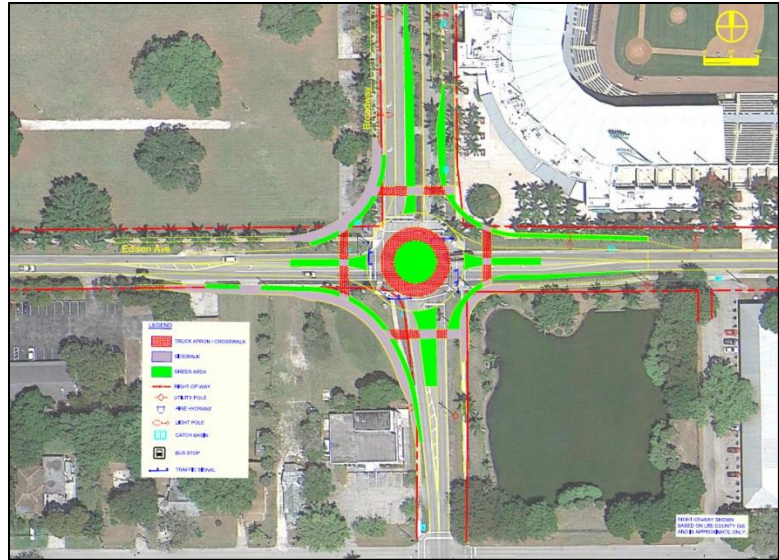
Pedestrian crossings will tie into the existing or relocated sidewalks. A bus stop is located on the west leg of the roundabout (north side of West First Street). Relocation of this bus stop will need to be coordinated with LeeTran during final design.



Drainage impacts are anticipated to be minor and consist of drainage modifications typical of intersection improvements. Utility and light pole relocations will be required, but are anticipated to be typical of intersection improvements.

Location #5. Edison Avenue / Broadway:

The roundabout concept is a single lane roundabout with eastbound, westbound, and southbound right turn lanes to accommodate projected 2040 volumes. Provisions have been made in the conceptual design to provide sufficient width within the circulatory roadway for the simultaneous passage of a semitrailer in combination with a passenger or single unit vehicle. Fastest paths for this roundabout are within design guideline recommendations.



This conceptual roundabout was developed to accommodate WB-50 design vehicles for both Edison Avenue and Broadway. The roundabout alignment was established to minimize impacts to the City of Palms Stadium and to the drainage pond in the southeast quadrant, which also results in minor right-of-way impacts in these quadrants.

On-street bike lanes are proposed on Edison Avenue and on Broadway. A minimum 10-foot sidewalk is being provided at this roundabout for cyclists who may not feel comfortable traversing the roundabout like other vehicles.

Pedestrian crossings will tie into the existing or relocated sidewalks. This roundabout will replace the existing traffic signal at this location. Mast arms, controller, and signal equipment will be removed. Utility relocations and drainage impacts are anticipated to be minor.

Edison Avenue is planned to be widened to four lanes in this area. At the same time, Edison Avenue will eventually be extended from US 41 west to McGregor Boulevard. The intent is that Edison Avenue will operate as a by-pass route for traffic to avoid portions of McGregor Boulevard, MLK Boulevard, and the intersection of US 41 / Victoria Avenue and US 41 / MLK Boulevard. In addition, this area is a planned redevelopment area, with higher density development being planned. For these reasons, the alternative roundabout design concept would have Edison Avenue as two lanes in each direction, northbound Broadway as a single lane, and southbound Broadway as a single-lane approach or a right turn lane and combination thru / left.

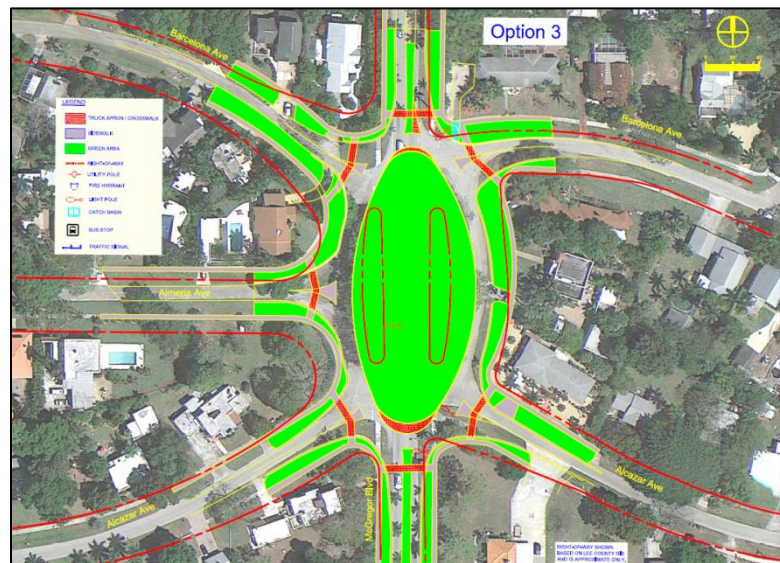
Location #6. McGregor Boulevard / Barcelona Avenue / Alcazar Avenue:

The conceptual roundabout is a single-lane roundabout, incorporating Barcelona Avenue and Alcazar Avenue into one large elliptical roundabout. This conceptual roundabout was developed to accommodate WB-62 design vehicles along McGregor Boulevard and WB-50 for all other movements.

A major benefit of this roundabout is that it eliminates the need for drivers on both side streets to select a gap in two lanes of very heavy traffic on McGregor Boulevard by replacing it with slower moving vehicles where side street drivers only have to find a gap in one direction of traffic. This change significantly reduces side street delay and makes left turns safer.

Some minor right-of-way impacts occur on the two southern corners. Drainage and utility impacts are anticipated to be minor.

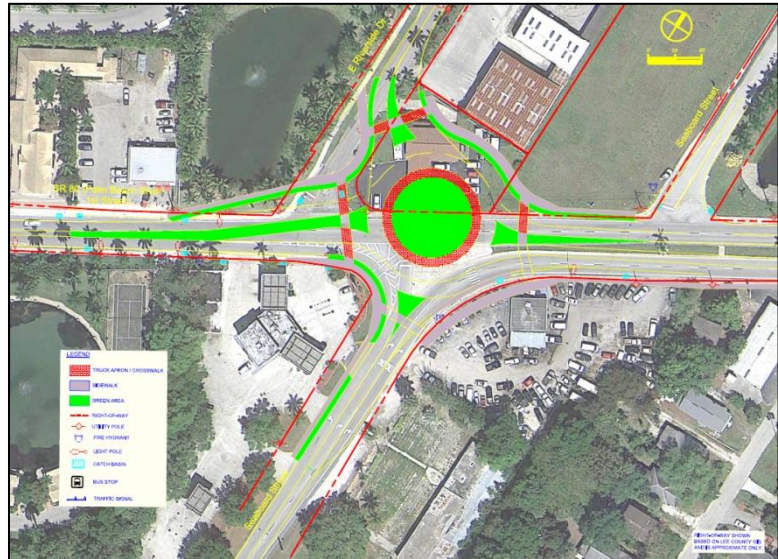
Pedestrian crossings tie into existing or relocated sidewalks. Fastest paths are within design guideline recommendations.





Location #8. Palm Beach Boulevard / Seaboard Street / First Street:

The conceptual roundabout consists of two eastbound lanes, two westbound lanes, one southbound lane, and two northbound lanes to accommodate projected 2040 volumes. Provisions have been made in the conceptual design to provide sufficient width within the circulatory roadway for the simultaneous passage of a semitrailer in combination with a passenger or single unit vehicle. Fastest paths for this roundabout are within design guideline recommendations.



This conceptual roundabout was developed to accommodate WB-62 design vehicles for Palm Beach Boulevard, Seaboard Street, and First Street. The roundabout has significant right-of-way impacts, including impacts on an existing building. Although this roundabout has a significant impact to the auto auction building on the north side of the intersection, it minimizes impacts to parking and access to the building to the north of the auto auction site. There will also be some right-of-way impacts to the parcel in the northwest quadrant where a drainage pond is located and the parcel in the southeast quadrant where an auto lot is located.

There are on-street bike lanes on Seaboard Street. On-street bike lanes are proposed on Palm Beach Boulevard. A minimum 10-foot sidewalk is being provided at this roundabout for cyclists who may not feel comfortable traversing the roundabout like other vehicles.

Pedestrian crossings will tie into the existing or relocated sidewalks. A bus stop is located on the east side of Seaboard Street approximately 400 feet south of the roundabout. There is also a bus stop on the north side of Palm Beach Boulevard approximately 500 feet west of the roundabout. Relocation of these bus stops, if necessary, will need to be coordinated with LeeTran during final design.

This roundabout will require the relocation of several utility poles and light poles. The existing drainage pond in the northwest quadrant will potentially be impacted.

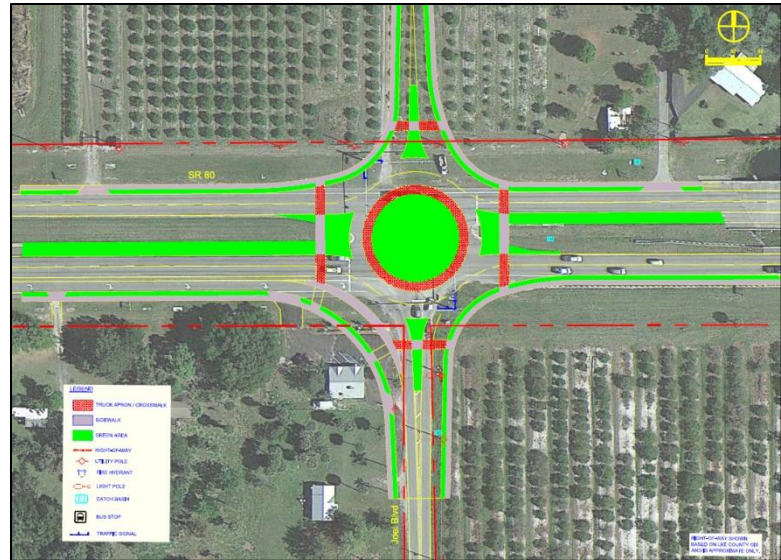
Location #9. SR 80 / Joel Boulevard:

The roundabout concept consists of two approach lanes on SR 80, with an eastbound right turn lane; a single-lane southbound; and a single-lane northbound with a right turn lane to accommodate projected 2040 volumes. Provisions have been made in the conceptual design to provide sufficient width within the circulatory roadway for the simultaneous passage of a

semitrailer in combination with a passenger or single unit vehicle. Fastest paths for this roundabout are within design guideline recommendations.

This conceptual roundabout was developed to accommodate WB-62 design vehicles for both SR 80 and Joel Boulevard. There will be significant impacts to the property in the southwest quadrant.

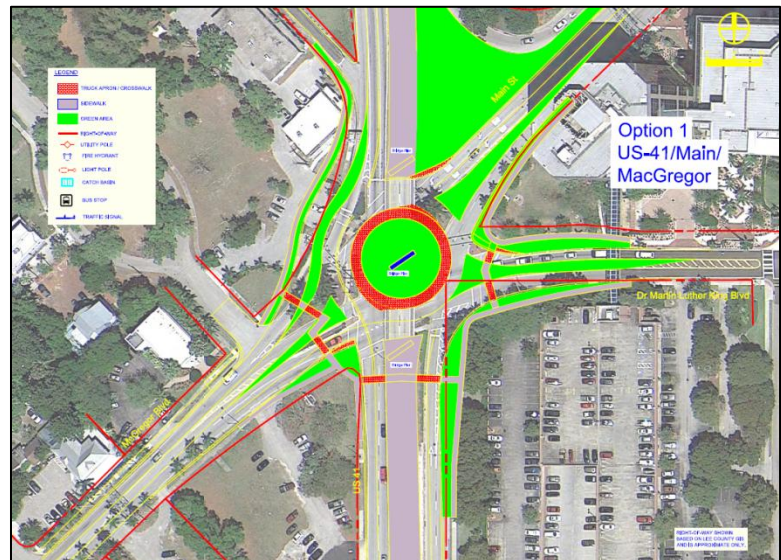
Pedestrian crossings will tie into the existing or relocated sidewalks. This roundabout will replace the existing traffic signal at this location. Mast arms, controller, and signal equipment will be removed. Drainage impacts are anticipated to be minor. Relocation of approximately 4 utility poles is anticipated.



Joel Boulevard is planned to be widened to four lanes in the future. The timing of that improvement, the turn lanes at the intersection and the required right-of-way are uncertain at this time.

Location #10. US 41 / MLK Boulevard / McGregor Boulevard:

The preferred roundabout at this complicated, five-legged intersection is a mixed lane roundabout. It includes three southbound lanes, including a separate right turn lane, a combination thru / right turn lane, and a combination thru/left turn lane; two eastbound lanes, including a separate left turn lane and a thru/ right turn lane; two northbound lanes, including a separate right turn lane and a thru / left turn lane; a single westbound lane; and two southwest bound lanes, with a separate left turn lane and a separate thru lane. The roundabout as proposed would be constructed without affecting the existing overpass.



The design vehicle for this roundabout was a WB-62 for all but minor movements around acute corners.

The roundabout is projected to perform better than a signal in both 2015 and 2040 and provide superior operations to the existing signalized intersection. In the future, a metering signal could be added to minimize impacts on McGregor Boulevard and vehicle queues extending northward from Victoria Avenue and into the roundabout.

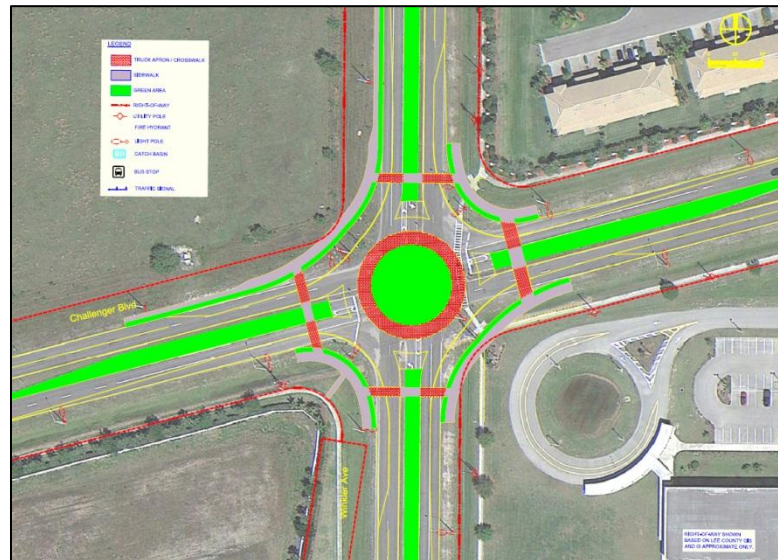
The timing of the eventuality of grade separating US 41 southbound (similar to US 41 northbound) is uncertain. If southbound US 41 were to be elevated to match northbound US 41, the roundabout could be left as is, or the second southbound lane could be closed at a relatively low cost.

Fastest paths for this roundabout are within design guideline recommendations. This roundabout will replace the existing traffic signal. The signal assembly, controller, and signal equipment will be removed. The roundabout has significant right-of-way impacts, including an existing building in the northwest quadrant. Drainage and utility impacts are anticipated to be minor.

Pedestrian crossings are provided and tie into existing sidewalks. MLK Boulevard, US 41, and McGregor Boulevard are active transit routes. Coordination will need to take place with Lee Tran during final design.

Location #11. Winkler Avenue / Challenger Boulevard:

A two-lane roundabout is proposed to accommodate projected 2040 volumes. This conceptual roundabout was developed to accommodate WB-62 design vehicles for both Winkler Avenue and Challenger Boulevard. Given the relatively modest traffic volumes under existing conditions, consideration should be given to designing and building the two-lane roundabout, but operating it as a one-lane roundabout until such time that approach volumes warrant expanding it to two-lanes.



An elementary school is located in the southeast quadrant. The roundabout will require relocation of a portion of the perimeter fence along the northwest corner of the school. The right-of-way impacts to the four quadrants can be considered relatively minor.

Fastest paths for this roundabout are within design guideline recommendations. Several light poles will need to be relocated. Drainage modifications will be needed to interconnect the roadside ditches along Challenger Boulevard and Winkler Avenue

On-street bike lanes are proposed on Winkler Avenue. A minimum 10-foot sidewalk is being provided at this roundabout for cyclists who may not feel comfortable traversing the roundabout like other vehicles.

Pedestrian crossings will tie into the existing or relocated sidewalks. There are existing bus stops on the north and south sides of Challenger Boulevard on the east leg of the roundabout. Relocation of these bus stops will need to be coordinated with LeeTran during final design.

Location #12. Colonial Boulevard / McGregor Boulevard:

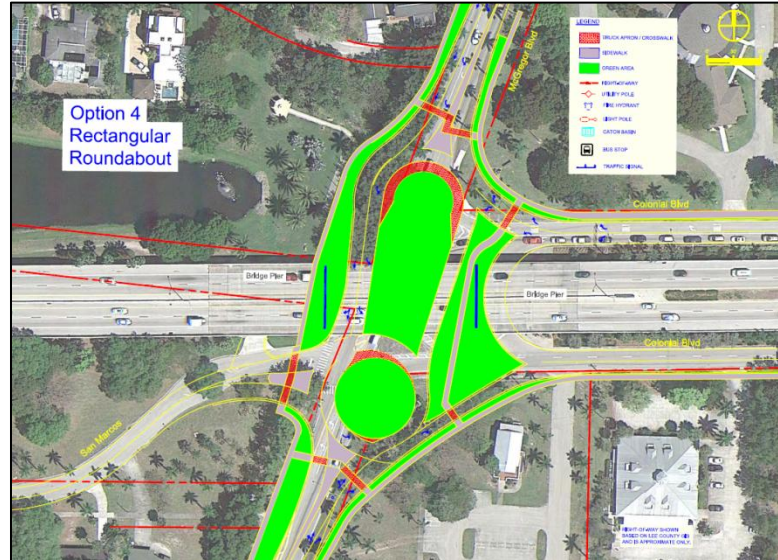
The preferred roundabout at this complicated intersection is a rectangular roundabout incorporating the two intersections into one. The roundabout is characterized by two southbound lanes, with a left turn lane and combination thru / right turn lane; two northbound lanes, with a separate right turn lane and combination thru / left turn lane; a single eastbound lane; and two westbound lanes, with a separate right turn lane and separate left turn lane. The roundabout design does not impact the overpass.

The design vehicle was a WB-62 for all movements, except for San Marcos which is a WB-50.

The roundabout has significant right-of-way impacts in all four quadrants. There are potential impacts on park lands in the northwest quadrant and on church property in the northeast quadrant. The majority of the right-of-way impacts are on public lands.

Pedestrian crossings will tie into the existing or relocated sidewalks.

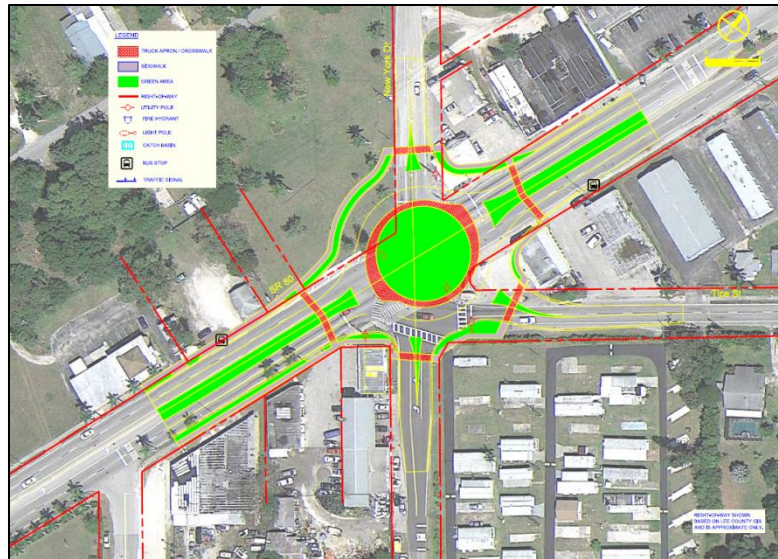
This roundabout will replace the existing traffic signal. The signal assembly, controller, and signal equipment will be removed.



Drainage and utility impacts are anticipated to be minor. Fastest paths for this roundabout are within design guideline recommendations.

Location #13. SR 80 / New York Drive / Tice Street:

The conceptual roundabout, at this five-legged intersection, has two-lanes on SR 80 and a single-lane on the other approaches. The roundabout improves a confusing and inefficient intersection, improves pedestrian and bicycle crossings, and reduces delays for all users.



This conceptual roundabout was developed to accommodate WB-62 design vehicles along SR 80 and WB-50 design vehicles on the other movements.

The roundabout has significant right-of-way impacts, including impacts on a building in the northeast quadrant, which may be a historic structure or area.

Pedestrian crossings will tie into the existing or relocated sidewalks.

SR 80 is an active transit line and there are bus stops in the vicinity of the roundabout. Coordination with LeeTran will need to take place during final design.

This roundabout will replace the existing traffic signal. The signal assembly, controller, and signal equipment will be removed. Drainage and utility impacts are anticipated to be minor. Fastest paths for this roundabout are within design guideline recommendations.

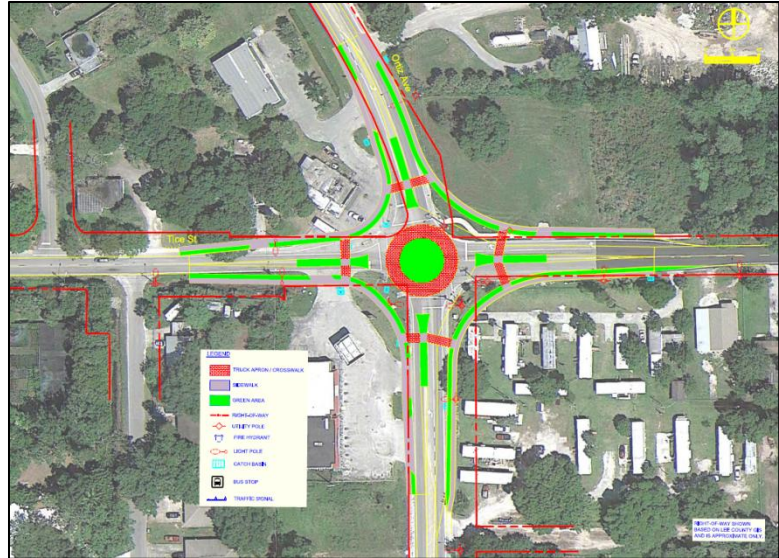
Location #14. Ortiz Avenue / Tice Street:

This conceptual roundabout is a single-lane roundabout and incorporates a northbound right turn lane and a westbound right turn lane to accommodate projected 2040 volumes. It was developed to accommodate WB-50 design vehicles for both Ortiz Avenue and Tice Street. Provisions have been made in the conceptual design to provide sufficient width within the circulatory roadway for the simultaneous passage of a semitrailer in combination with a passenger or single unit vehicle. Fastest paths for this roundabout are within design guideline recommendations.

This roundabout will result in some right-of-way impacts to the mobile home park on the southeast quadrant, as well as access to the convenience store on the northwest quadrant.



Pedestrian crossings will tie into the existing or relocated sidewalks. There is an existing bus stop on the west side of Ortiz Avenue south of the roundabout. No relocation is anticipated due to its location downstream from the roundabout, but its final location will need to be coordinated with LeeTran.

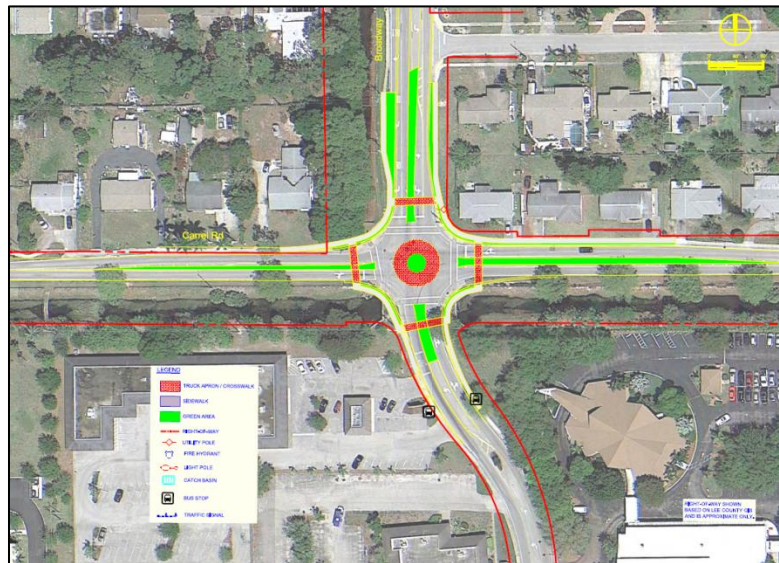


This roundabout will replace the existing traffic signal. The span wire assembly, controller, and signal equipment will be removed. This location has minor drainage impacts, and involves relocation of several utility poles and light poles.

Ortiz Avenue is planned to be widened to four-lanes in the future. However, the timing of the improvement is uncertain. For this reason, an alternative roundabout concept would reflect two approach lanes on Ortiz Avenue.

Location #15. Carrell Road/ Broadway:

The conceptual roundabout at this location is a single-lane roundabout. The roundabout was developed to accommodate a WB-50 design vehicle for all movements.



The roundabout has minor right-of-way impacts. Utility impacts are anticipated to be minor.

It is likely that the roundabout will have some drainage impacts. Those impacts are anticipated to be in the northwest, southwest and southeast quadrants.

This roundabout will replace the existing traffic signal. The signal assembly, controller, and signal equipment will be removed.

Fastest paths for this roundabout are within design guideline recommendations. Pedestrian crossings will tie into the existing or relocated sidewalks.

Broadway is an active transit line and there are bus stops in the vicinity of the roundabout. Coordination with LeeTran will need to take place during final design.

Location #16. Michigan Avenue Link / Marsh Avenue:

The conceptual roundabout at this location is a single-lane roundabout. The roundabout was developed to accommodate a WB-50 design vehicle for all movements.

The roundabout has minor right-of-way impacts. Utility and drainage impacts are anticipated to be minor. Fastest paths for this roundabout are within design guideline recommendations.

The roundabout provides improved pedestrian crossings between the apartment complex and bus stop and lowers vehicle speeds along Michigan Avenue Link. Pedestrian crossings will tie into the existing or relocated sidewalks.

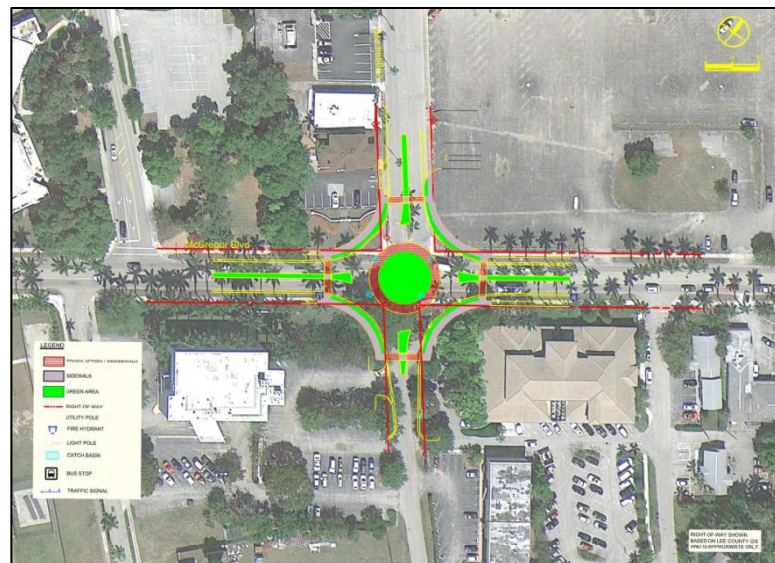


Michigan Avenue Link / Marsh Avenue are active transit lines and there is a bus stop in the vicinity of the roundabout. Coordination with LeeTran will need to take place during final design.

Location #17. McGregor Boulevard / Virginia Avenue:

The conceptual roundabout is a single-lane roundabout. This conceptual roundabout was developed to accommodate WB-62 design vehicles for McGregor Boulevard and WB-50 design vehicles for Virginia Avenue.

The roundabout alignment has right-of-way impacts in all four quadrants, but keeps impacts to all quadrants to a minimum. The access along Virginia Avenue to the property on the southeast quadrant will be impacted. However, that property has two



access points to its parking facility.

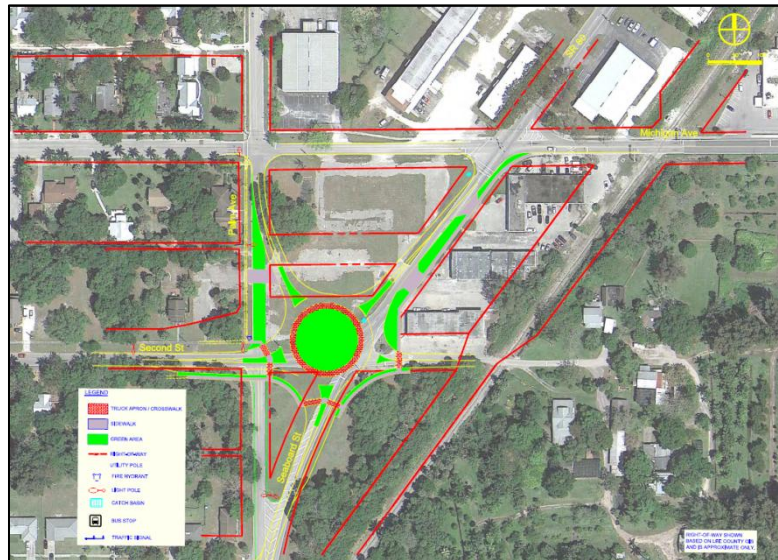
Virginia Avenue to the south of McGregor Boulevard will be the future Edison Avenue extension from US 41. This extension is anticipated to add traffic volumes to the south approach and function as a potential by-pass of portions of McGregor Boulevard and MLK Boulevard and the intersections of US 41 / Victoria Avenue and US 41 / MLK Boulevard.

Fastest paths for this roundabout are within design guideline recommendations. Minor drainage and some utility impacts are anticipated.

Pedestrian crossings will tie into the existing or relocated sidewalks. Existing bus stops are located on the north and south sides of McGregor Boulevard on the east side of the roundabout. Coordination with LeeTran will need to take place during final design.

#### Location #18. Second Street / Seaboard / Palm Avenue:

This conceptual roundabout is a single-lane roundabout with an eastbound right turn lane and northbound left turn lane to accommodate projected 2040 volumes. This roundabout concept combines the intersections of Second Street and Palm Avenue, and Second Street and Seaboard Street into one intersection and utilizes the vacant lot in the northwest quadrant. It was developed to accommodate WB-62 design vehicles for Second Street West and Seaboard Street East, and WB-50 design vehicles for Palm Avenue and Second Street East.



Fastest paths for this roundabout are within design guideline recommendations. Drainage and utility impacts are anticipated to be minor.

There are on-street bike lanes on Seaboard Street and on Palm Avenue. On-street bike lanes are proposed on Second Street. In addition, a bike greenway will be located along Seaboard Street. A minimum 10-foot sidewalk is being provided at this roundabout for cyclists who may not feel comfortable traversing the roundabout like other vehicles.

Pedestrian crossings will tie into the existing or relocated sidewalks. There is an existing bus stop on the south side of Second Street, just west of Palm Avenue on the west leg of the roundabout. However, the one-way pair of First Street / Second Street / Seaboard is planned to be converted

back to two-way operations. Therefore, this bus stop and future bus stops will need to be coordinated with LeeTran during final design.

## **6. Opinion of Probable Construction Costs**

Construction cost estimates associated with the roundabout geometric concept plans were prepared for each location and are presented in the report titled Lee County MPO Roundabout Study Cost Estimates and dated May 26, 2016. Task 6. Opinion of Probable Construction Costs of the study's scope of services specifies that a concept level "Engineer's Opinion of Probable Construction Cost" be prepared for each roundabout design concept.

Total construction costs were developed for each roundabout concept plan and include two components: construction and right-of-way.

### **Construction Costs**

Concept level opinions of probable construction costs were developed for a typical single lane roundabout, and for a typical two-lane roundabout. These estimates were prepared using construction costs that include earthwork, roadway, drainage, signing and pavement markings, and lighting. Utility and landscaping costs were also included in the estimates, along with maintenance of traffic and mobilization costs. Quantity estimates of roadway pay items such as base, asphaltic concrete, curb and gutter, sidewalk, and sod, for example, along with FDOT's item average unit prices were used to determine the roundabout costs.

### **Right-of-Way Costs**

Right-of-way cost estimates were developed using the right-of-way lines and "just" values derived from the Lee County Property Appraiser's data base. Impacts included land area, parking lots, structures, and access. The Lee County Property Appraisers data base was used for estimating costs, with the recognition that the Property Appraiser's assessed or "just" value is not always comparable to actual market value. In addition, costs estimates are planning level estimates and do not include factors such as damages, relocation costs, and others.

### **Total Construction Costs**

Total construction costs are conceptual planning level estimates only and represent "order of magnitude" estimates for comparative purposes.

Estimated total construction costs for the preferred roundabout concept at each of the 18 locations are presented in Exhibit 5 and summarized below.

**Total Construction Cost Estimates**

<u>Location</u>	<u>Total Estimated Costs</u> <sup>(1)</sup>	
	<u>Low</u>	<u>High</u>
#1. Buckingham Road / Cemetery Road	\$ 685,000	\$ 740,000
#2. Buckingham Road/ Gunnery Road	\$ 860,000	\$ 910,000
#3. Periwinkle Way / Causeway Boulevard / Lindgren	\$ 460,000	\$ 510,000
#4. West First Street / Altamonte Avenue	\$1,600,000	\$1,950,000
#5. Edison Avenue / Broadway	\$ 570,000	\$ 630,000
#6. McGregor Boulevard / Barcelona / Alcazar	\$1,110,000	\$1,215,000
#7. MLK Boulevard / Lee Street	\$ 265,000	\$ 320,000
#8. Palm Beach Boulevard / Seaboard	\$ 955,000	\$1,050,000
#9. SR 80 / Joel Boulevard	\$ 755,000	\$ 835,000
#10. US 41 / McGregor Boulevard / MLK	\$2,010,000	\$2,240,000
#11. Winkler Avenue / Challenger Boulevard	\$ 760,000	\$ 790,000
#12. Colonial Boulevard / McGregor Boulevard	\$1,535,000	\$1,665,000
#13. SR 80 / New York / Tice Street	\$ 910,000	\$1,000,000
#14. Ortiz Avenue / Tice Street	\$ 650,000	\$ 715,000
#15. Broadway / Carrell Road	\$ 310,000	\$ 360,000
#16. Michigan Avenue Link / Marsh Avenue	\$ 380,000	\$ 410,000
#17. McGregor Boulevard / Virginia Avenue	\$ 450,000	\$ 500,000
#18. Second Street / Seaboard / Palm Avenue	\$1,045,000	\$1,155,000

Footnote:

(1) Conceptual level cost estimates, subject to surveys, detailed engineering studies, appraisals, and other factors. Planning level estimates only. Construction costs based on FDOT pricing estimates with adjustments. Right-of-way area and value estimates derived from Lee County Property Appraiser's website.

As shown above and in Exhibit 5, total construction costs range from a low for a mini-roundabout at **Martin Luther King Boulevard / Lee Street / Thompson Street (Location #7)** to a high at **US 41 / McGregor Boulevard / Martin Luther King Boulevard (Location #10)**.

## Exhibit 5

### Total Construction Cost Estimates - Roundabouts

<u>Location</u>	<u>Construction Cost Estimates <sup>(1)</sup></u>					
	<u>Construction Costs</u>		<u>Right-of-Way Costs <sup>(2)</sup></u>		<u>Total Costs</u>	
	<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
#1. Buckingham Road / Cemetery Road <sup>(3)</sup>	\$ 650,000	\$ 700,000	\$ 35,000	\$ 40,000	\$ 685,000	\$ 740,000
#2. Buckingham Road / Gunnery Road	\$ 850,000	\$ 900,000	\$ 10,000	\$ 10,000	\$ 860,000	\$ 910,000
#3. Periwinkle Way / Causeway Boulevard / Lindgren <sup>(3)</sup>	\$ 450,000	\$ 500,000	\$ 10,000	\$ 10,000	\$ 460,000	\$ 510,000
#4. West First Street / Altamonte Avenue <sup>(4)</sup>	\$ 400,000	\$ 450,000	\$1,200,000	\$1,500,000	\$1,600,000	\$1,950,000
#5. Edison Avenue / Broadway <sup>(3)</sup>	\$ 550,000	\$ 600,000	\$ 20,000	\$ 30,000	\$ 570,000	\$ 630,000
#6. McGregor Boulevard / Barcelona / Alcazar	\$1,100,000	\$1,200,000	\$ 10,000	\$ 15,000	\$1,110,000	\$1,215,000
#7. MLK Boulevard / Lee Street <sup>(3,7)</sup>	\$ 250,000	\$ 300,000	\$ 15,000	\$ 20,000	\$ 265,000	\$ 320,000
#8. Palm Beach Boulevard / Seaboard <sup>(4)</sup>	\$ 800,000	\$ 850,000	\$ 155,000	\$ 200,000	\$ 955,000	\$1,050,000
#9. SR 80 / Joel Boulevard	\$ 700,000	\$ 750,000	\$ 75,000	\$ 85,000	\$ 755,000	\$ 835,000
#10. US 41/ McGregor Boulevard / MLK <sup>(4,5)</sup>	\$1,500,000	\$1,600,000	\$ 510,000	\$ 640,000	\$2,010,000	\$2,240,000
#11. Winkler Avenue / Challenger Boulevard <sup>(3)</sup>	\$ 750,000	\$ 780,000	\$ 10,000	\$ 10,000	\$ 760,000	\$ 790,000
#12. Colonial Boulevard / McGregor Boulevard <sup>(3,6)</sup>	\$1,400,000	\$1,500,000	\$ 135,000	\$ 165,000	\$1,535,000	\$1,665,000
#13. SR 80 / New York / Tice Street <sup>(4)</sup>	\$ 750,000	\$ 800,000	\$ 160,000	\$ 200,000	\$ 910,000	\$1,000,000
#14. Ortiz Avenue / Tice Street <sup>(3)</sup>	\$ 600,000	\$ 650,000	\$ 50,000	\$ 65,000	\$ 650,000	\$ 715,000
#15. Broadway / Carrell Road	\$ 300,000	\$ 350,000	\$ 10,000	\$ 10,000	\$ 310,000	\$ 360,000
#16. Michigan Avenue Link / Marsh Avenue <sup>(3)</sup>	\$ 370,000	\$ 400,000	\$ 10,000	\$ 10,000	\$ 380,000	\$ 410,000
#17. McGregor Boulevard / Virginia Avenue	\$ 370,000	\$ 400,000	\$ 80,000	\$ 100,000	\$ 450,000	\$ 500,000
#18. Second Street / Seaboard / Palm Avenue <sup>(3)</sup>	\$1,000,000	\$1,100,000	\$ 45,000	\$ 55,000	\$1,045,000	\$1,155,000

Footnote:

- (1) Conceptual level cost estimates, subject to surveys, detailed engineering studies, appraisals, and other factors. Planning level estimates only. Construction costs based on FDOT pricing estimates with adjustments for drainage, signing and marking, lighting, utilities, landscaping, mobilization, maintenance of traffic, contingencies, and other factors. Right-of-way area and value estimates derived from Lee County Property Appraiser's website. Parcel values reported as 2015 "just" value. Assumptions made as to impact area and adjusted inputs. While inputs include land, buildings, parking and access, cost estimates are planning level only. Cost estimates do not include business damages, relocation costs, access impacts, market values, and other factors.
- (2) If right-of-way impacts present, minimum value of \$10,000 assumed.
- (3) Includes some publicly owned lands.
- (4) Includes impacts to buildings.
- (5) Reflects Option 1. Option 2 not considered due to impact on clearance, bridge structure and ramp.
- (6) Reflects Option 4.
- (7) Mini roundabout.



## **7. Evaluation and Ranking**

Following the operational analysis, preparation of geometric concept plans, and estimates of total construction costs, the 18 proposed roundabouts were evaluated and ranked. The report titled Lee County MPO Roundabout Study Evaluation and Ranking and dated May 26, 2016 details the evaluation and ranking of the proposed roundabout geometric concept plans. Task 7. Evaluation and Ranking Proposed Roundabout Projects of the study's scope of services specifies that criteria and a methodology to evaluate and rank the proposed roundabout concepts will be prepared and, based on the rankings, priorities will be established that will assist in identifying projects for project development and funding.

### **Criteria**

Twenty criteria were established to perform the evaluation of the 18 roundabout concepts. The roundabout concepts were evaluated against each other using these criteria. The criteria are summarized below.

- |                                    |  |
|------------------------------------|--|
| 1. Safety                          | 11. Automobile Mobility                |
| 2. Existing Congestion             | 12. Transit Mobility                   |
| 3. Future Congestion               | 13. Truck / Emergency Vehicle Mobility |
| 4. Benefit – Cost Ratio            | 14. Pedestrian Mobility                |
| 5. Funding                         | 15. Bicycle Mobility                   |
| 6. Construction Ready              | 16. Downstream Constraints             |
| 7. Implementation                  | 17. Historic & Cultural Impacts        |
| 8. Construction Costs              | 18. Parks                              |
| 9. Right-of-Way Impacts            | 19. Utilities                          |
| 10. Business / Residential Impacts | 20. Drainage                           |

The technical report provides a description of the twenty criteria, along with the measurement of each. During the evaluation, each criterion was rated as “unfavorable”, “favorable”, or “highly favorable” with a numeric value applied to each.

### **Criteria Weighting**

Initially, all criteria were considered to be of equal importance in the evaluation. However, the resultant evaluation revealed that treating all criteria the same did not help distinguish the differences between the varying roundabout conceptual designs and reinforced the conclusion that the criteria, in fact, were not of equal importance. The weighting, or prioritization, of the evaluation criteria according to their relative importance became a key part of the evaluation process.

After reviewing all considerations, the criteria were specifically organized by the degree of importance such as “important”, “very important” and “extremely important” where a higher degree of importance corresponds to higher weight in the evaluation. Various weighting alternatives were considered and applied in the evaluation. They included:



Extremely Important

Safety  
Existing Congestion  
Future Congestion  
Benefit – Cost

Very Important

Funding  
Construction Readiness  
Implementation  
Construction Costs  
Right-of-Way Impacts  
Business Impacts  
Residential Impacts  
Automobile Mobility  
Transit Mobility  
Large Vehicle Mobility

Important

Pedestrian Mobility  
Bicycle Mobility  
Downstream Constraints  
Historic/Cultural Impacts  
Park Impacts  
Utility Impacts  
Drainage Impact

**Evaluation and Ranking**

The evaluation criteria, using the measurements as described in the technical report, were applied to the preferred roundabout geometric concept plan prepared for each location. Each criteria, as it applied to the individual roundabout concept plan, was rated as unfavorable, favorable, or highly favorable and given a corresponding numeric score. The numeric score was then multiplied by the criteria weight to obtain a weighted value. The weighted value for each criterion was then added to obtain a total score for the individual roundabout and a ranking of each.

The results of the evaluation and technical ranking are summarized below.

**Technical Ranking**

<b><u>Ranking</u></b>	<b><u>Location</u></b>
#1	Periwinkle Way / Causeway Boulevard / Lindgren
#2	Buckingham Road / Gunnery Road
#3	Winkler Avenue / Challenger Boulevard
#4	SR 80 / New York / Tice Street
#5	Ortiz Avenue / Tice Street
#6	SR 80 / Joel Boulevard
#7	McGregor Boulevard / Colonial Boulevard
	Edison Avenue / Broadway
#9	MLK Boulevard / Lee Street
#10	Broadway / Carrell Road
#11	McGregor Boulevard / Virginia Avenue
#12	Buckingham Road / Cemetery Road
#13	Michigan Avenue Link / Marsh Avenue
#14	Palm Beach Boulevard / Seaboard
	US 41 / MLK / McGregor Boulevard
#16	Second Street / Seaboard / Palm Avenue
#17	McGregor Boulevard / Barcelona / Alcazar
#18	West First Street / Altamonte Avenue



## **Priority Ranking**

The technical ranking was based on a strict application of the criteria and weighting. In some instances, it may overlook or reduce the importance of some other considerations, such as ease of implementation, jurisdictional responsibility, potential funding, community or jurisdiction acceptance, and timing, to name only a few.

Therefore, the consulting team developed a priority ranking of the “top” six priority roundabouts, the “middle” six, and the “bottom” six roundabouts. These were then reviewed with the Roundabout Steering Committee at its March 29, 2016 meeting and a consensus was reached on the top five, middle eight, and bottom five roundabouts.

The top five roundabouts, as recommended by the Roundabout Steering Committee and confirmed by the MPO and listed in the order of priority, include the following.

1. **Periwinkle Way / Causeway Boulevard / Lindgren, Location #3** – based on congestion concerns.
2. **Winkler Road / Challenger Boulevard, Location #11** – based on safety concerns.
3. **Buckingham Road / Gunnery Road, Location #2** – based on safety concerns.
4. **McGregor Boulevard / Colonial Boulevard, Location #12** – based on safety and congestion concerns.
5. **Michigan Avenue Link / Marsh Avenue, Location #16** – based on sight distance and traffic calming concerns.

### **Roundabout Priority Ranking**

#### **Top Five**

- **Periwinkle Way / Causeway Boulevard / Lindgren, Location #3**
- **Winkler Road / Challenger Boulevard, Location #11**
- **Buckingham Road / Gunnery Road, Location #2**
- **McGregor Boulevard / Colonial Boulevard, Location #12**
- **Michigan Avenue Link / Marsh Avenue, Location #16**

#### **Middle Eight**

- **Buckingham Road / Cemetery Road, Location #1**
- **Edison Avenue / Broadway, Location #5**
- **Palm Beach Boulevard / Seaboard Street / First Street, Location #8**
- **SR 80 / Joel Boulevard, Location #9**
- **SR 80 / Tice Street / New York Drive, Location #13**
- **Ortiz Avenue / Tice Street, Location #14**
- **Broadway / Carrell Road, Location #15**
- **McGregor Boulevard / Virginia Avenue, Location #17**

#### **Bottom Five**

- **West First Street / Altamonte Avenue, Location #4**
- **McGregor Boulevard / Barcelona Avenue / Alcazar Avenue, Location #6**
- **MLK / Lee Street / Thompson Street, Location #7**
- **US 41 / MLK / McGregor Boulevard, Location #10**
- **Second Street / Seaboard Street / Palm Avenue, Location #18**

## **8. Traffic Modeling and Simulation**

Traffic simulation was undertaken for two roundabout locations in an effort to better visualize and understand the roundabout operations. The report titled Lee County MPO Roundabout Study Traffic Modeling and Simulation details the traffic modeling and simulation undertaken for the two roundabout locations. Task 8. Traffic Modeling and Simulation of the study's scope of services specifies that traffic flow at two roundabout locations will be modeled so that the public may be better able to visualize the geometry and traffic operations at two potentially challenging and complicated roundabout locations.

### **Roundabout Locations**

The two locations selected for traffic modeling and simulation were **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)** and **Colonial Boulevard / McGregor Boulevard (Location #12)**. **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)** was selected because it was the top rated roundabout location from an operational standpoint and characterized by heavy traffic volumes, congestion, and pedestrian and bicycle activity. **Colonial Boulevard / McGregor Boulevard (Location #12)** was selected because of heavy traffic volumes, safety considerations, and complicated geometrics.

The two locations were recommended for traffic simulation by the Roundabout Steering Committee and the MPO's TAC and CAC committees. The Lee County MPO Board approved the selection of the two roundabout locations at its April 22, 2016 meeting.

The roundabout geometric concept plans that were tested in the simulation are shown in Appendix C. They included Option 1, right turn slip lane, for **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)** and Option 4, rectangular roundabout, for **Colonial Boulevard / McGregor Boulevard (Location #12)**.

### **Traffic Modeling Software**

The traffic modeling and simulation for the two roundabout locations was completed using VISSIM (Version 7.00-16). VISSIM is a microscopic, multi-modal traffic flow simulation software package. It has the capability of simulating customized intersection geometry that cannot be done with other software and different types of traffic (car, pedestrian, bicycle) simultaneously. VISSIM is an excellent tool for visual simulation, but it is not intended for detailed operational analysis, such as level-of-service, delay, and the like.

### **Traffic Data**

The traffic inputs for the simulation were derived from existing and future traffic data from Task 3 of this study. The specific inputs included existing and 2040 forecasted AM and PM peak hour, peak season turn volumes. Pedestrian and bicycle traffic flows, along with truck percentages, were taken from existing traffic counts and were kept constant for 2040 conditions.

**Simulation Scenarios**

Four simulation scenarios were specified in the scope of services for each of the two roundabout locations. They included, for each location, two critical peak hours and the years 2015 (existing) and 2040. For comparison purposes, additional scenarios were modeled including future year 2040 intersection operations under existing traditional intersection geometry for both locations and enhanced pedestrian and bicycle activity at **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)**.

The simulation scenarios that were undertaken are summarized as the following.

<u>Intersection</u>	<u>Scenario</u>
Periwinkle Way / Causeway Boulevard / Lindgren Boulevard	2040 PM Peak Hour Existing Geometrics 2015 AM Peak Hour With Roundabout 2015 PM Peak Hour With Roundabout 2040 AM Peak Hour With Roundabout 2040 PM Peak Hour With Roundabout 2040 PM Peak Hour With Roundabout and Enhanced Pedestrian & Bicycle Traffic
Colonial Boulevard / McGregor Boulevard	2040 PM Peak Hour Existing Geometrics 2015 AM Peak Hour With Roundabout 2015 PM Peak Hour With Roundabout 2040 AM Peak Hour With Roundabout 2040 PM Peak Hour With Roundabout

**Simulation Results**

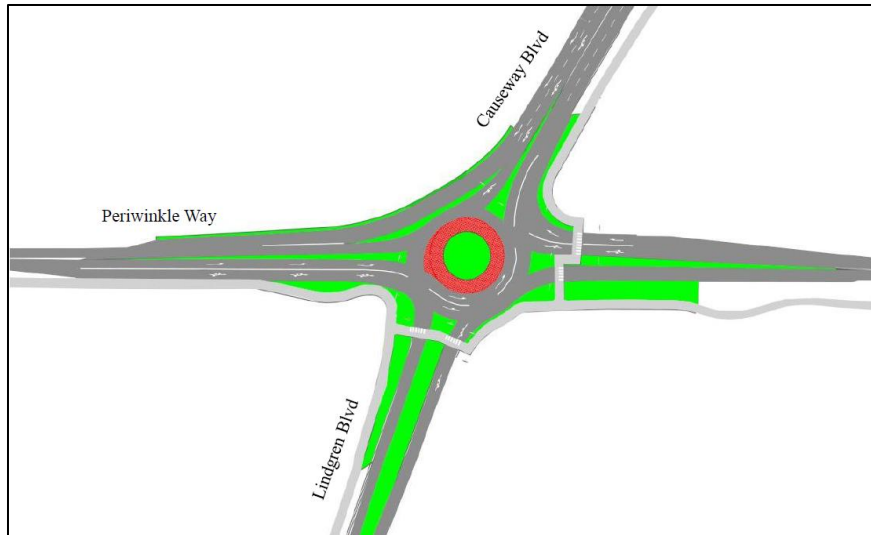
While the VISSIM traffic modeling / simulation was intended to provide a visualization of the roundabout operations, the simulations, in particular at the intersection of **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard**, resulted in additional improvement recommendations to improve operations. Those additional improvements are noted below.

**Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3):**

Consistent with the operational analysis, the simulation showed that the roundabout performs significantly better than the existing four way stop controlled intersection under existing and future traffic conditions. However, during the 2040 simulation setup and testing, it was noticed that the surrounding roadway layout impacted the roundabout operations. The first observation was that the location of the northbound merge on Causeway Boulevard appeared too close to the roundabout because merging vehicles were backing up towards the intersection. To address this, the northbound merge from two lanes to one lane was moved further north to allow a smoother transition for vehicles. Therefore, as part of the eventual roundabout improvement, it is recommended that the northbound merge be moved several hundred feet further north.



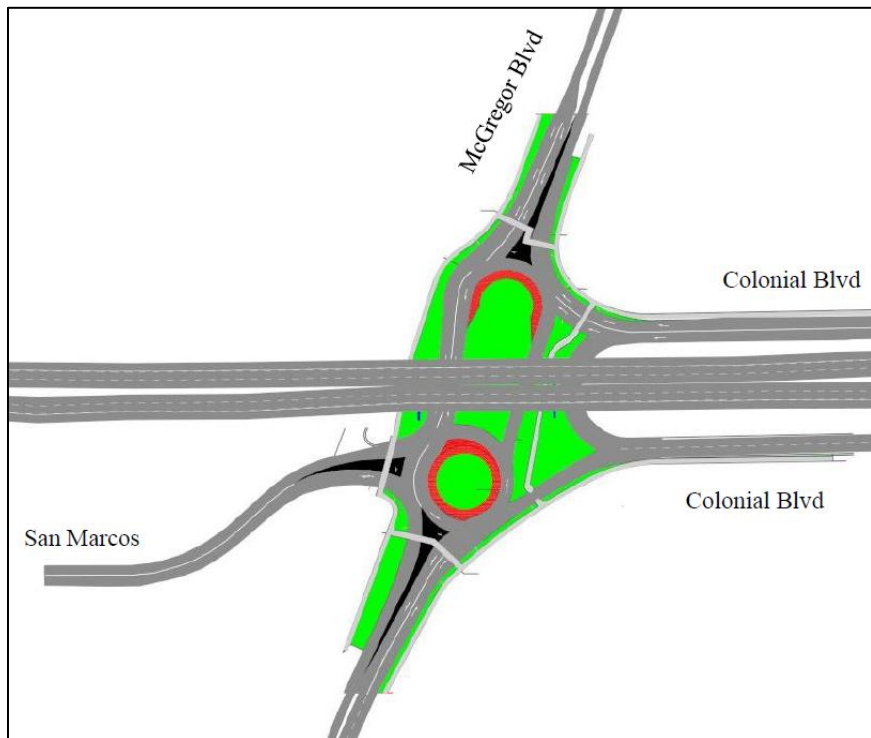
The second observation was that the westbound thru traffic at the roundabout, at times, would queue back to the east and block the westbound right turn lane. For that reason, the westbound right turn lane was extended further east to allow more vehicular storage. Therefore, as part of the eventual roundabout improvement, it is recommended that the westbound right turn lane be extended further east.



**Colonial Boulevard / McGregor Boulevard (Location #12):**

To better simulate the traffic conditions at the **Colonial Boulevard / McGregor Boulevard** intersection, the adjacent intersection of Colonial Boulevard / Summerlin Road was included in the traffic modeling and simulation. The inclusion of the adjacent intersection caused some metering of traffic volumes on Colonial Boulevard and some significant queuing, particularly under the heavier 2040 traffic flow conditions. The queuing was primarily found on the Colonial Boulevard thru lanes. The operations at the adjacent intersection did not have an observable negative impact on the existing intersection or the roundabout at **Colonial Boulevard / McGregor Boulevard**.

The traffic modeling and simulation for the existing geometrics showed significant delays and queuing for both the northbound and southbound traffic under future (2040) traffic volumes.



The proposed roundabout performed better than the existing geometry under 2040 traffic volumes. This was demonstrated by reduced queuing and delay on the northbound and southbound approaches.

### 9. 30% Design Plans

30% design plans were prepared for two roundabout locations. They included **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)** and **Winkler Avenue / Challenger Boulevard (Location #11)**.

The report titled Lee County MPO Roundabout Study 30% Design Plans and dated December 15, 2016 details the preparation of 30% design plans for two roundabout locations. Task 9. Conduct Survey and Develop 30% Design Drawings of the study’s scope of services specifies that preliminary engineering drawings will be prepared for two roundabout locations from Task 7. Evaluation and Ranking Proposed Roundabout Projects.

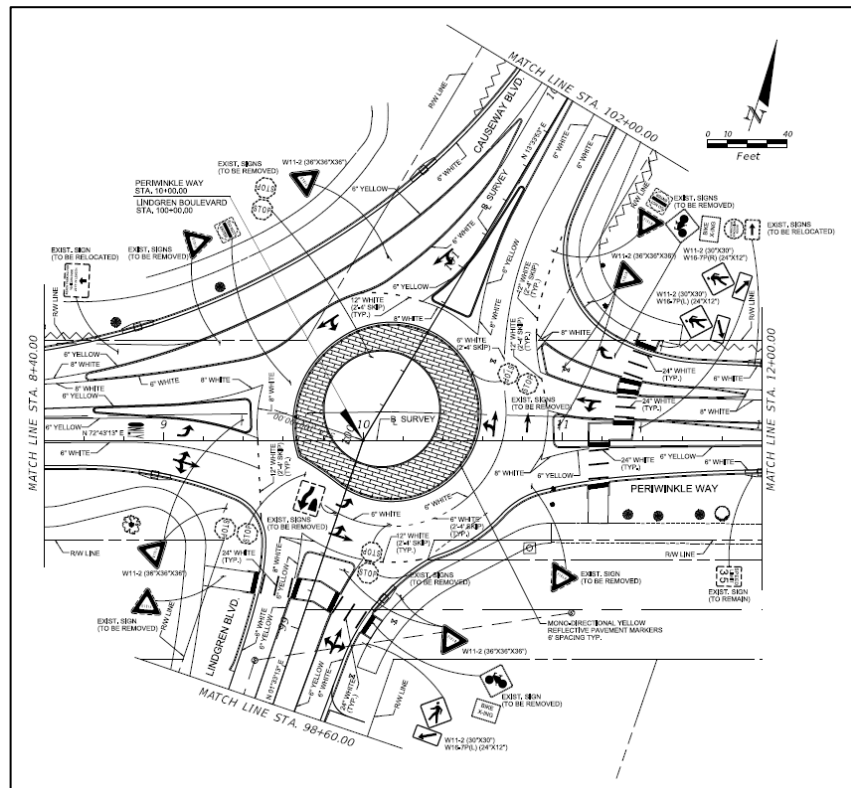
#### 30% Design Plans

At its April 22, 2016 meeting, the Lee County MPO Board reviewed the roundabout evaluation and ranking and selected two roundabouts for 30% design plans. The two roundabout locations included **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3)** and **Winkler Avenue / Challenger Boulevard (Location #11)**.

Preliminary 30% design plans were first prepared by DPA and then provided to Alternate Street Design, DPA’s subconsultant, for “peer” review. The peer review was undertaken by Alternate Street Design and detailed review comments provided. Those comments were reviewed by DPA and the preliminary 30% design plans revised to reflect the comments.

The 30% design plans were then distributed to the Roundabout Steering Committee on September 2, 2016 for member review. Comments were received from LeeTran (for the Winkler Road / Challenger Boulevard location) and from Alternate Street Design. Those comments have been recorded and will be addressed if, and when, the 30% design plans proceed towards final design.

The 30% design plans for the roundabout at **Periwinkle Way / Causeway Boulevard / Lindgren Boulevard**



(Location #3) are provided in Appendix E. The 30% design plans for the roundabout at Winkler Avenue / Challenger Boulevard (Location #11) are provided in Appendix F.

### Design Considerations

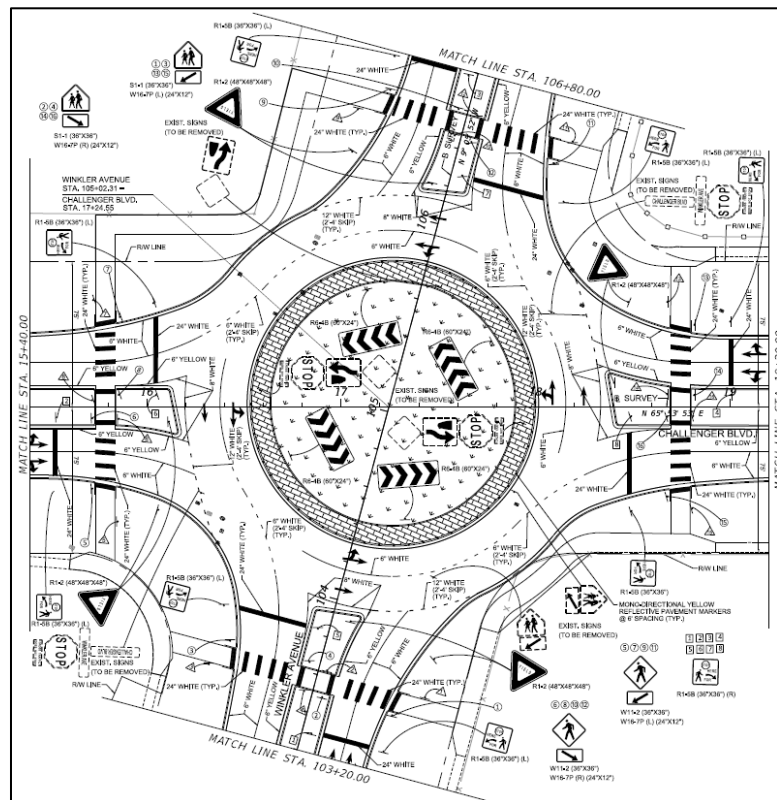
Topographic surveys were performed at the two priority roundabout locations for use in the preparation of the 30% design plans. The surveys show existing features, such as roadway pavement, curbs, sidewalks, bike paths, grass swales, driveways, drainage structures, above-ground utilities, and signs. Cross section elevations were also obtained for the development of the preliminary vertical geometric design.

Design standards and guidelines used in the preparation of the 30% design plans included the following.

- National Cooperative Highway Research Program (NCHRP) Report 672, Roundabouts: An Informational Guide, 2nd Edition.
- NCHRP Report 674, Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities.
- Florida Department of Transportation's 2015 Design Standards.
- Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition.

Additional considerations include 10' shared use paths within the limits of the roundabouts and pedestrian treatments to address the needs of the visually impaired.

For the roundabout located at Periwinkle Way / Causeway Boulevard / Lindgren Boulevard (Location #3), the recommendation to extend the westbound right turn lane, as supported by the VISSM simulation, has been reflected in the design. The recommendation to move the northbound merge several hundred feet further north should be further evaluated and addressed as the project moves towards final design.





## **10. Community Involvement**

The Lee County MPO Roundabout Study included extensive community involvement and multiple presentations to various organizations.

The kick-off meeting was held at the offices of DPA on November 10, 2015. Those in attendance included the Project Team as well as member of the Roundabout Steering Committee. The Roundabout Steering Committee, which was assembled to advise, oversee and review the progress of the study, was comprised of members representing Lee County MPO, City of Fort Myers, City of Sanibel, FDOT, Lee County DOT, and LeeTran. The kick-off meeting was held to address the specific needs and plans of the study and to discuss the implications of designing roundabouts for each location.

In addition to the kick-off meeting, there were a total of three Roundabout Steering Committee meetings. The Roundabout Steering Committee meetings were held on December 14, 2015, February 11, 2016, and March 29, 2016. Updates on project status and results of completed tasks were presented and discussed. Open discussion of project results was encouraged to allow committee members to provide comments and recommendations. The Roundabout Steering Committee played a critical role for guiding project outcomes and voicing the needs of various jurisdictions.

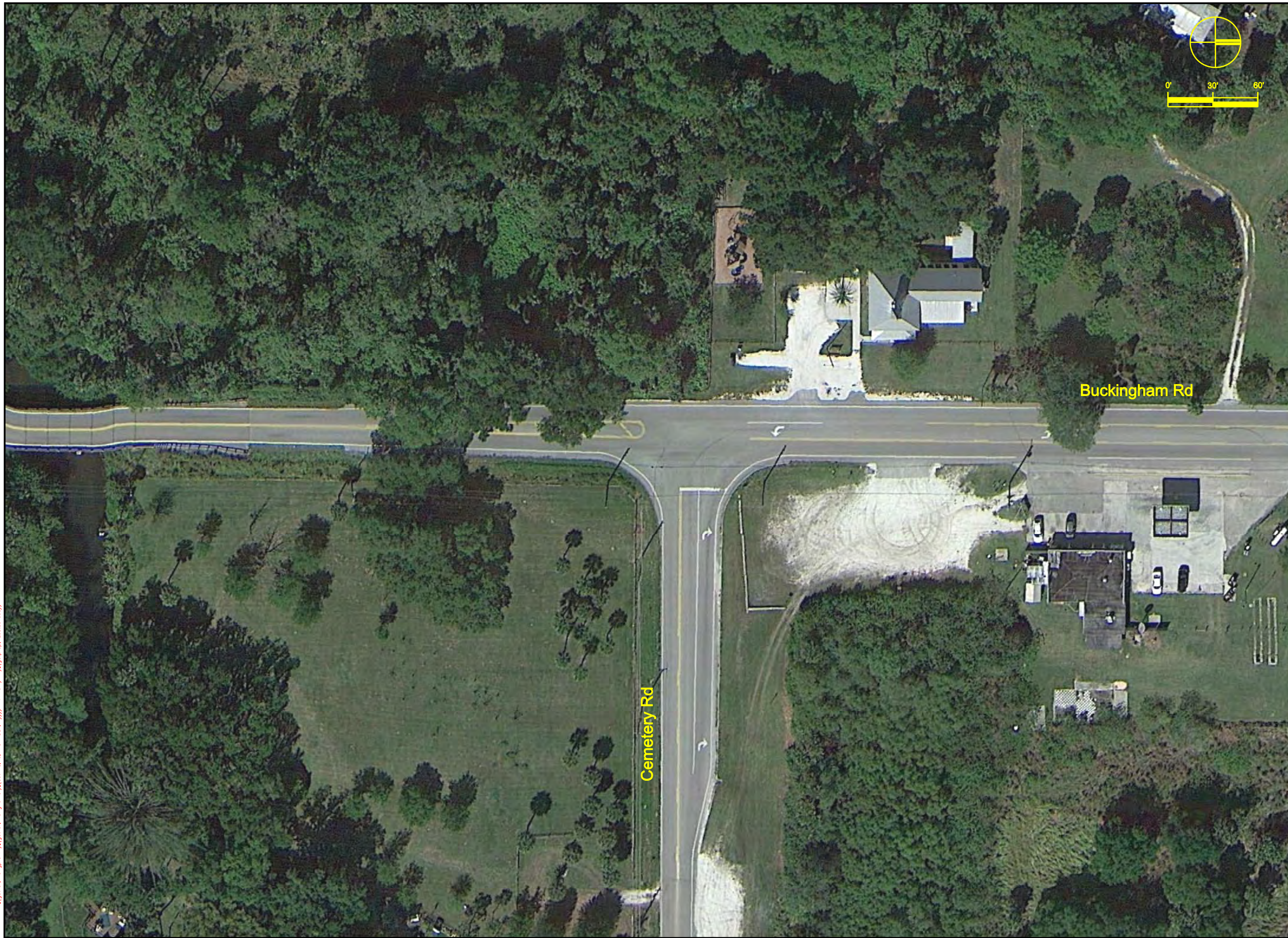
<b><u>Meetings / Presentations</u></b>
<b>Kick-Off Meeting / Steering Committee</b>
• November 10, 2015
<b>Sanibel Public Works Department</b>
• November 12, 2015
<b>Steering Committee Meeting #1</b>
• December 14, 2015
<b>Steering Committee Meeting #2</b>
• February 11, 2016
<b>Fort Myers Public Works Department</b>
• February 24, 2016
<b>MPO Board</b>
• March 28, 2016
<b>Steering Committee #3</b>
• March 29, 2016
<b>Citizens Advisory Committee</b>
• April 7, 2016
<b>Technical Advisory Committee</b>
• April 7, 2016
<b>Visually Impaired Community</b>
• April 7, 2016
<b>MPO Board</b>
• April 22, 2016
<b>Fort Myers City Council</b>
• May 16, 2016
<b>FDOT, Bartow</b>
• May 23, 2016
<b>MPO Board</b>
• February 17, 2017

Study presentations were given to the MPO including: the Citizen Advisory Committee, the Technical Advisory Committee and the MPO Board. The study was presented to the MPO's Citizen Advisory Committee and Technical Advisory Committee on April 7, 2016 to provide comments, direction and select the intersections to proceed to 30% design and to undergo traffic simulation. A total of three study update presentations were given to the Lee County MPO Board at critical points in the study, including March 18, 2016, April 22, 2016, and the final report on February 17, 2017.

Multiple presentations and meetings were held with groups outside of those mentioned above. Meetings were held with the City of Sanibel Public Works Department (November 12, 2015) and City of Fort Myers Public Works Department (February 24, 2016). An overview of the study was presented to the City of Fort Myers City Council on May 16, 2016. FDOT District 1 staff in Bartow was consulted on May 23, 2016 to evaluate the eligibility of state and federal funding for the study locations. To improve the safety characteristics of the roundabout designs, a meeting with the visually impaired community was held on April 7, 2016 to gather opinions and recommendations to accommodate the area's most vulnerable pedestrians.

The final presentation to the Lee County MPO Board, which was held on February 17, 2017, summarized the findings and conclusions of the Roundabout Study. The presentation included an overview of the tasks completed to date, roundabout simulations, aerial drone footage, and the 30% design plans of the top two priority roundabout locations. Also, the Project team's engineers and planners were present during the meeting to address questions raised by the MPO Board members and the public. After the Project team addressed all questions and concerns, the MPO Board passed a motion to accept the final report.

**APPENDIX A**  
**AERIAL PHOTO BASE MAPS**



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mjwalwork@comcast.net



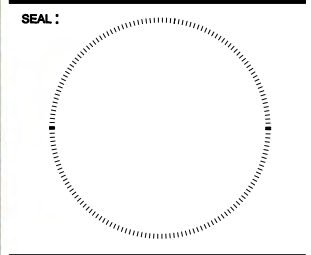
815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
(239)244-2220  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
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AGENCY NO :

REVISIONS/SUBMISSIONS :

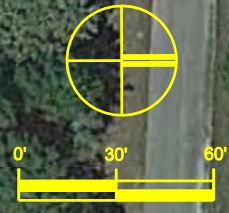
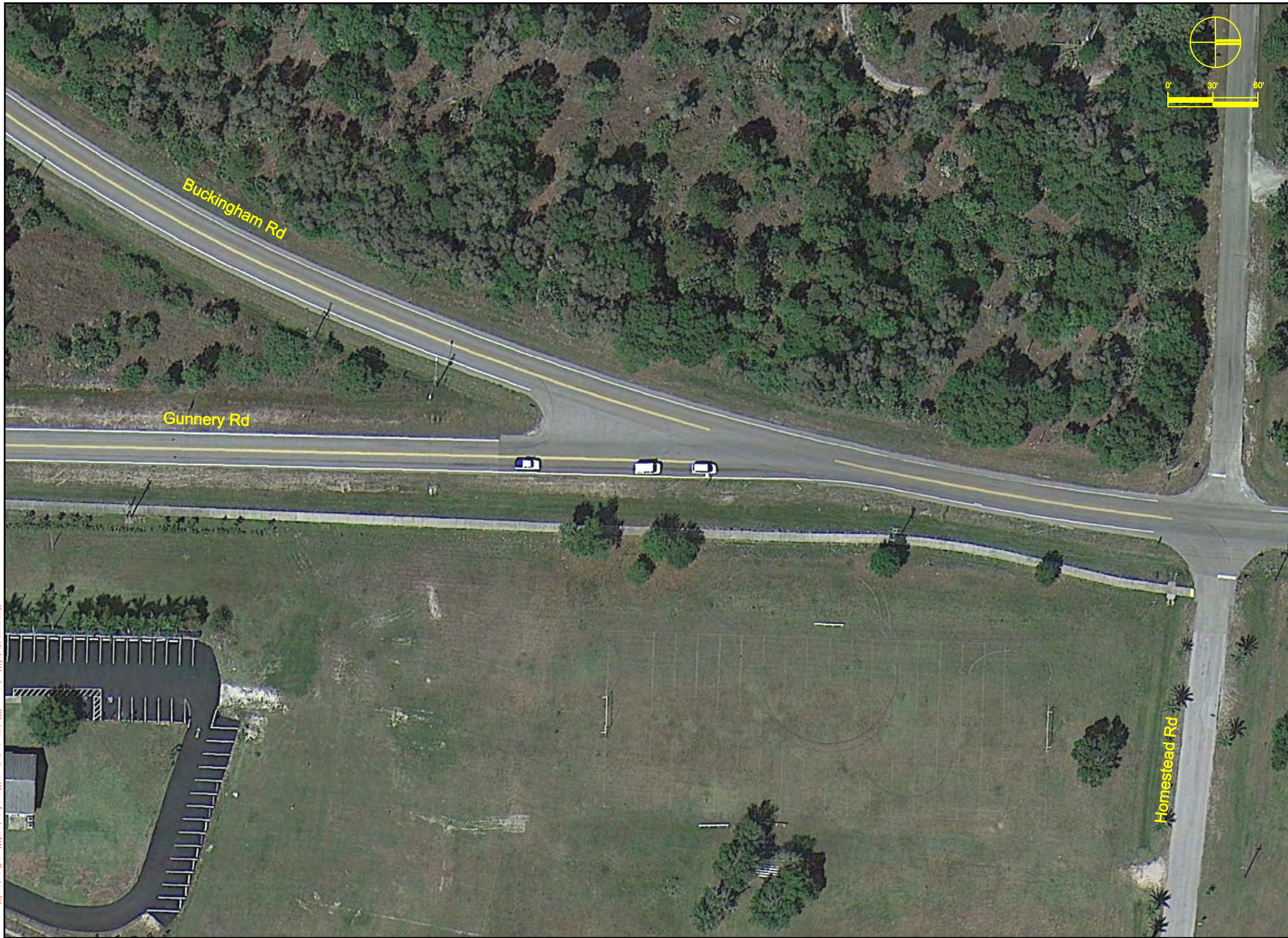
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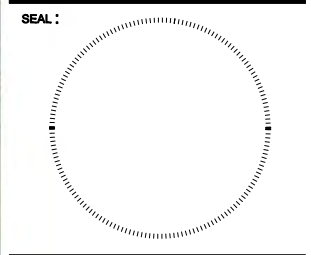
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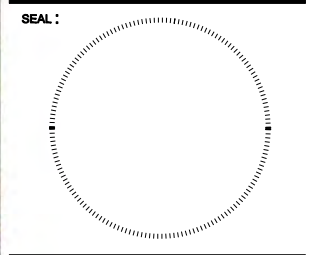
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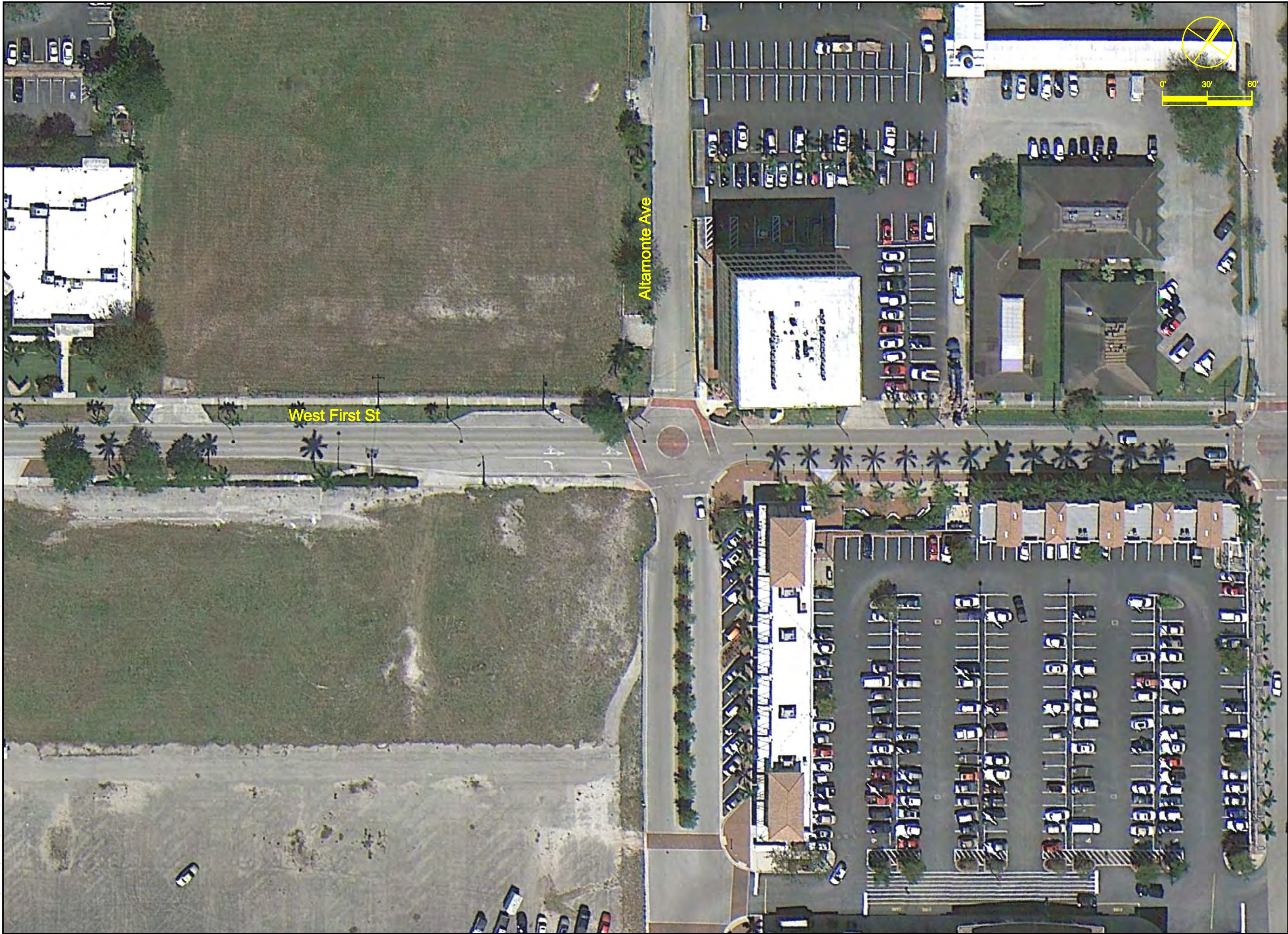
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Lindgren Blvd**

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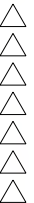
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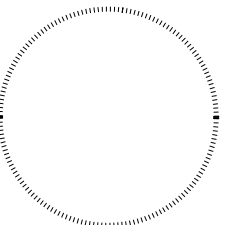
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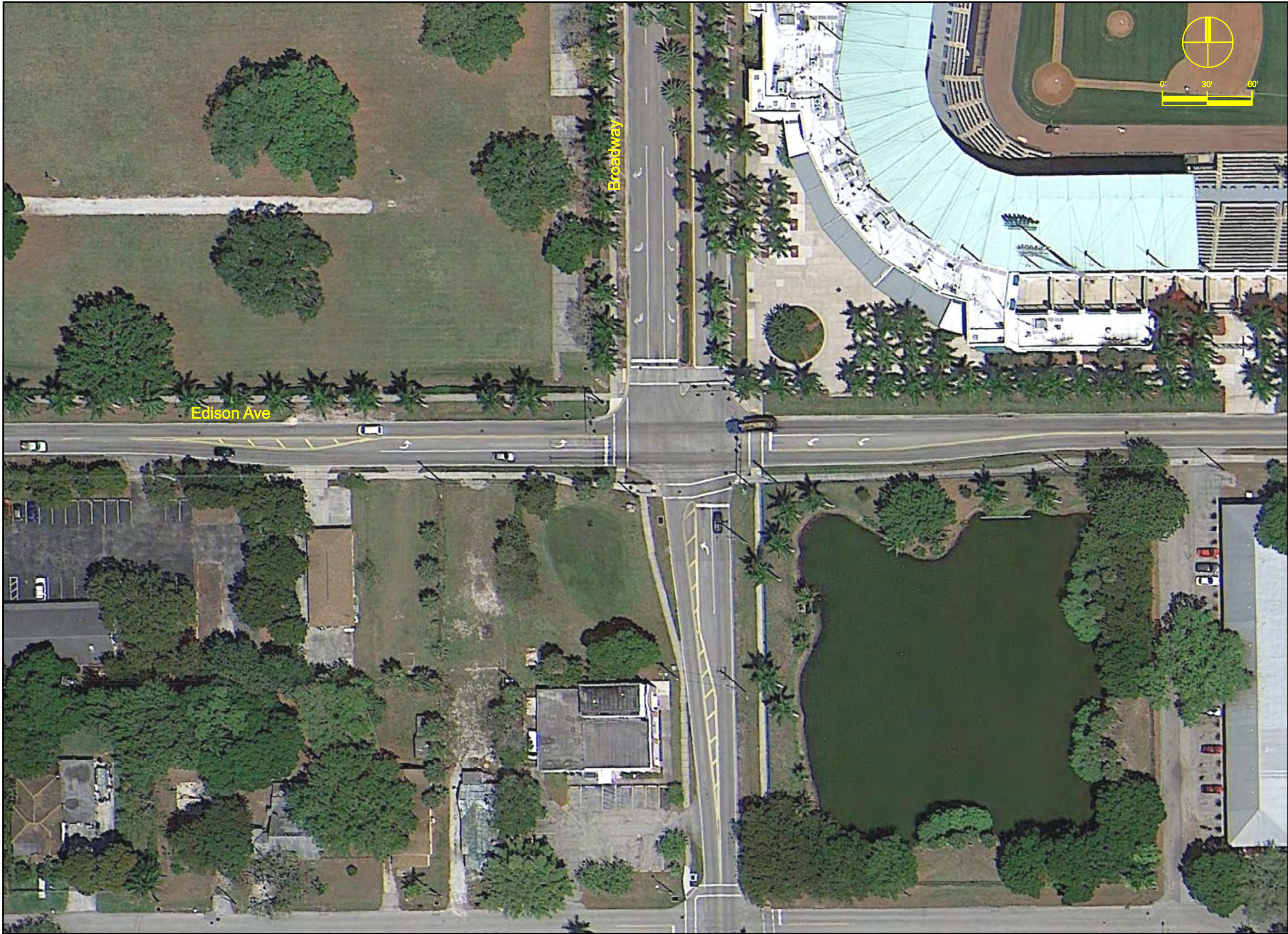


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**Altamonte Ave &  
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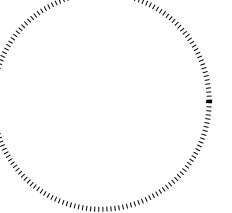
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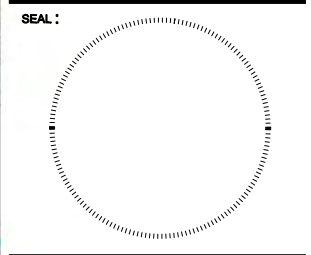
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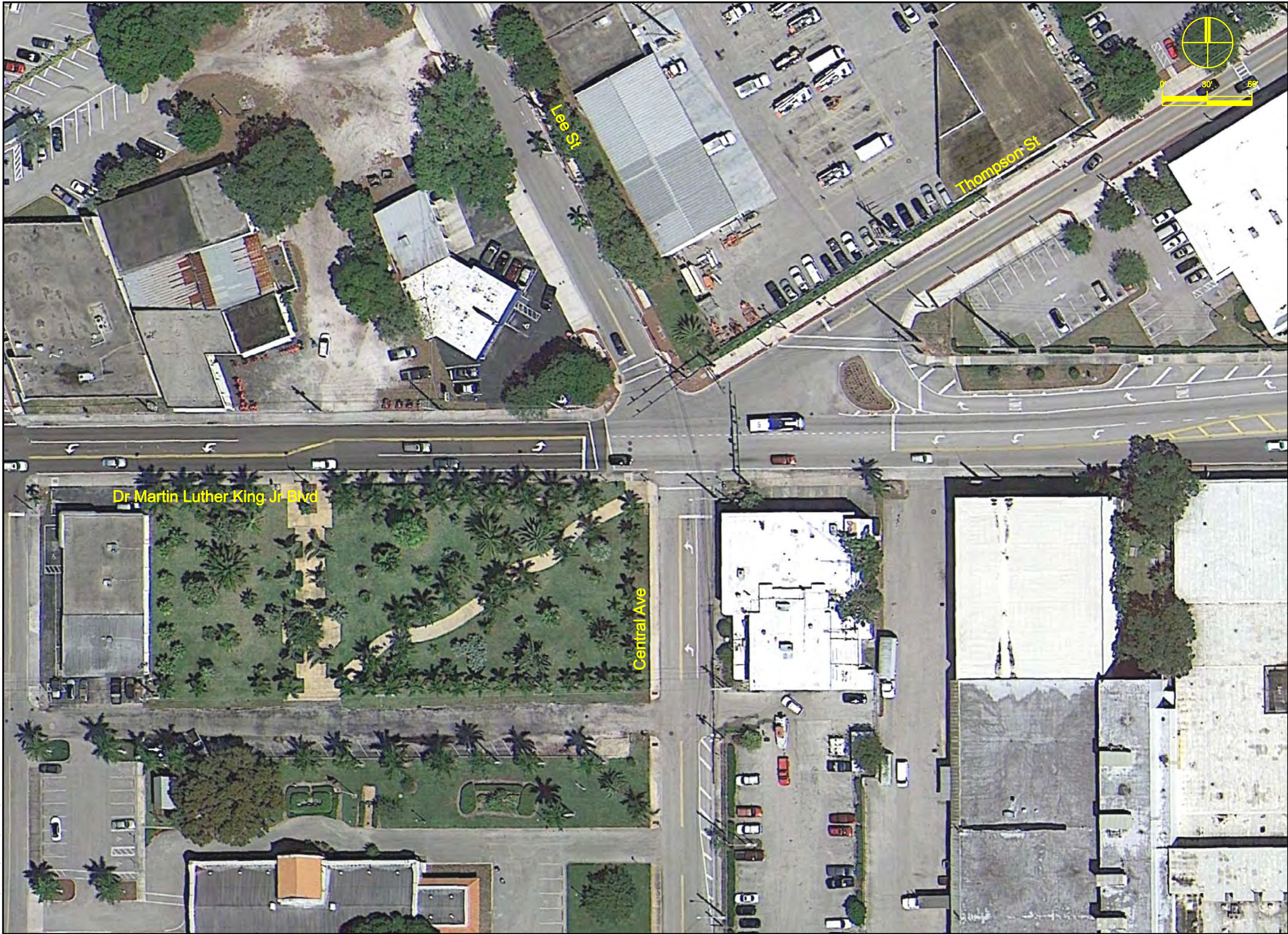
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Barcelona Ave**

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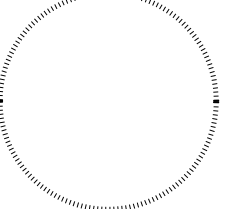
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SEAL :



DRAWING TITLE :

**M.L.K. Jr. Blvd &  
Lee St**

DRAWING NO :

**7**



**DAVID PLUMMER  
AND  
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2149 McGregor Boulevard  
Fort Myers, Florida 33901  
Phone: (239)-332-2617

dpa@dplummer.com  
FLORIDA REGISTRATION NUMBER: 2690



**Alternate Street Design, PA.**  
1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwalwork@comcast.net



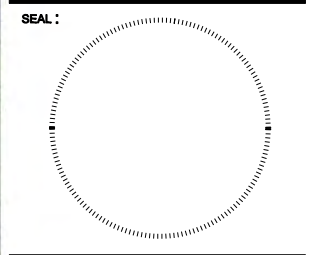
815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
(239) 244-2220  
www.leempo.com

PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

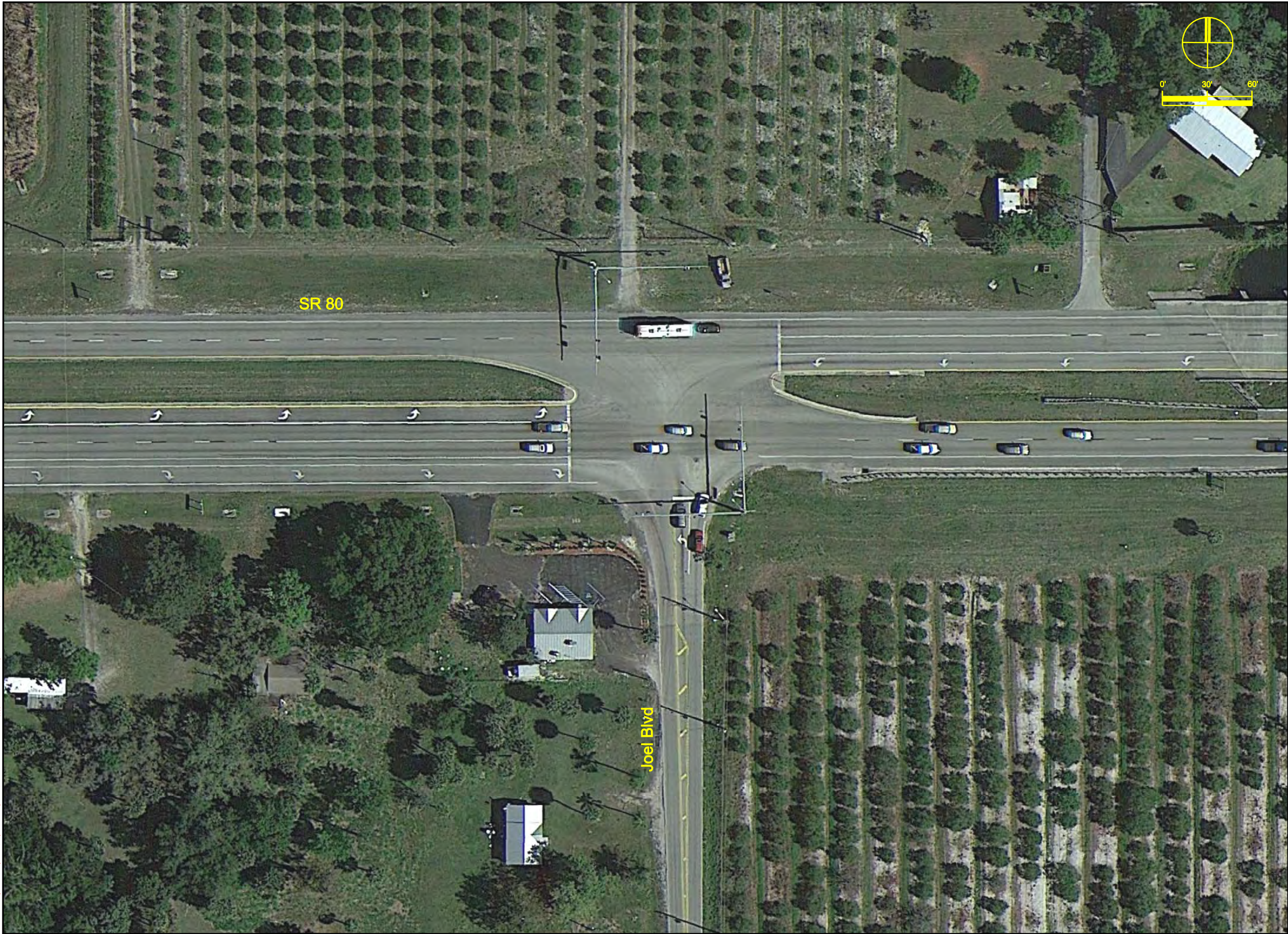
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DRAWING TITLE :  
**SR 80/Seaboard &  
First St**

DRAWING NO :  
**8**

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904-269-1851  
mjwalwork@comcast.net



815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :

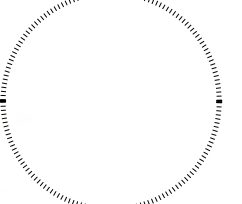
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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SEAL :

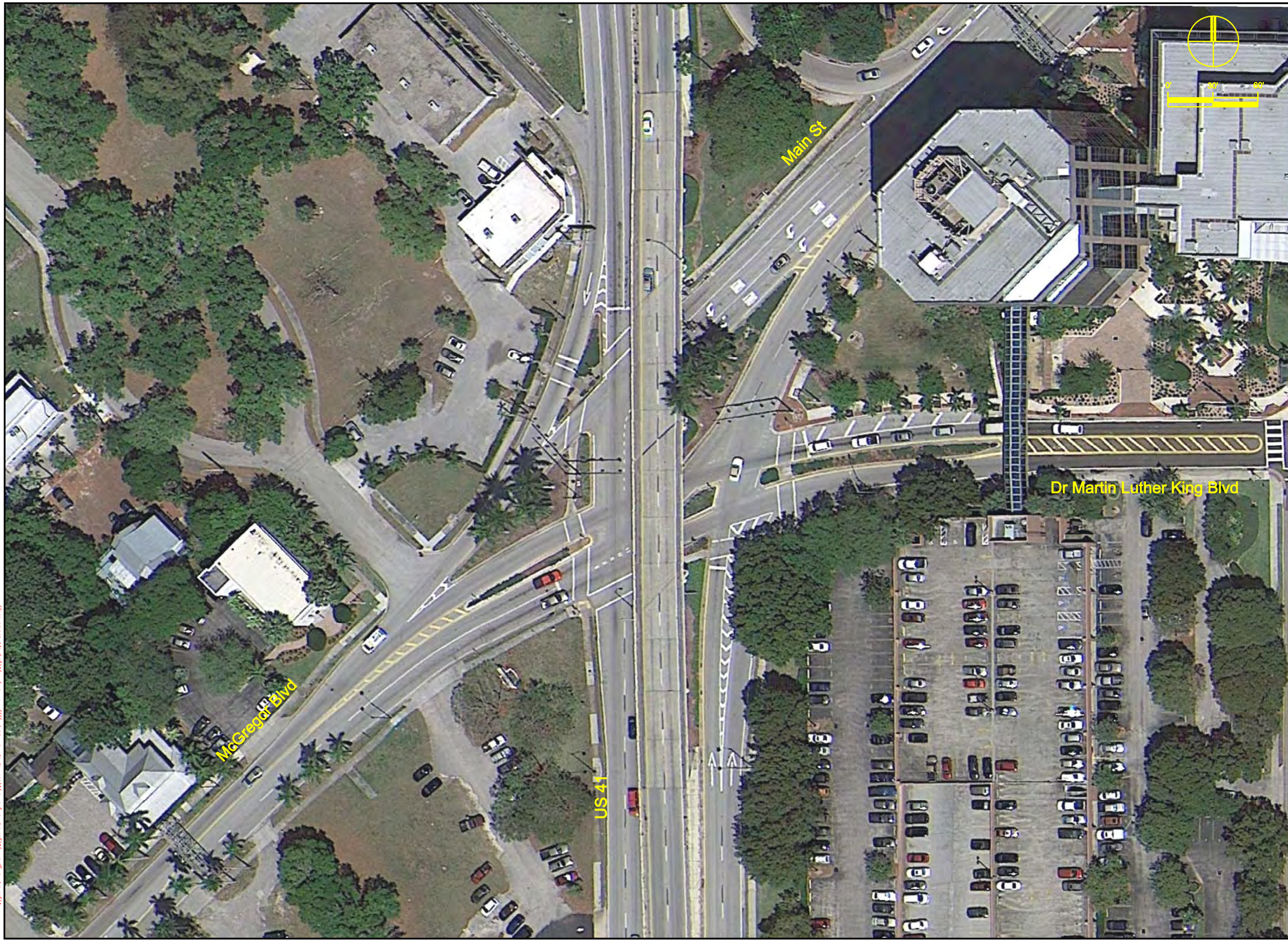


DRAWING TITLE :

**State Road 80 &  
Joel Blvd**

DRAWING NO :

**9**



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AND  
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1516 Platfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwalwork@comcast.net



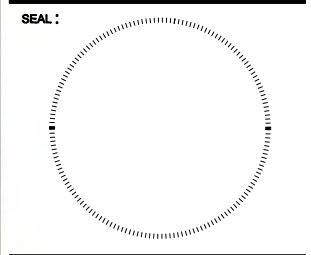
815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2016  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

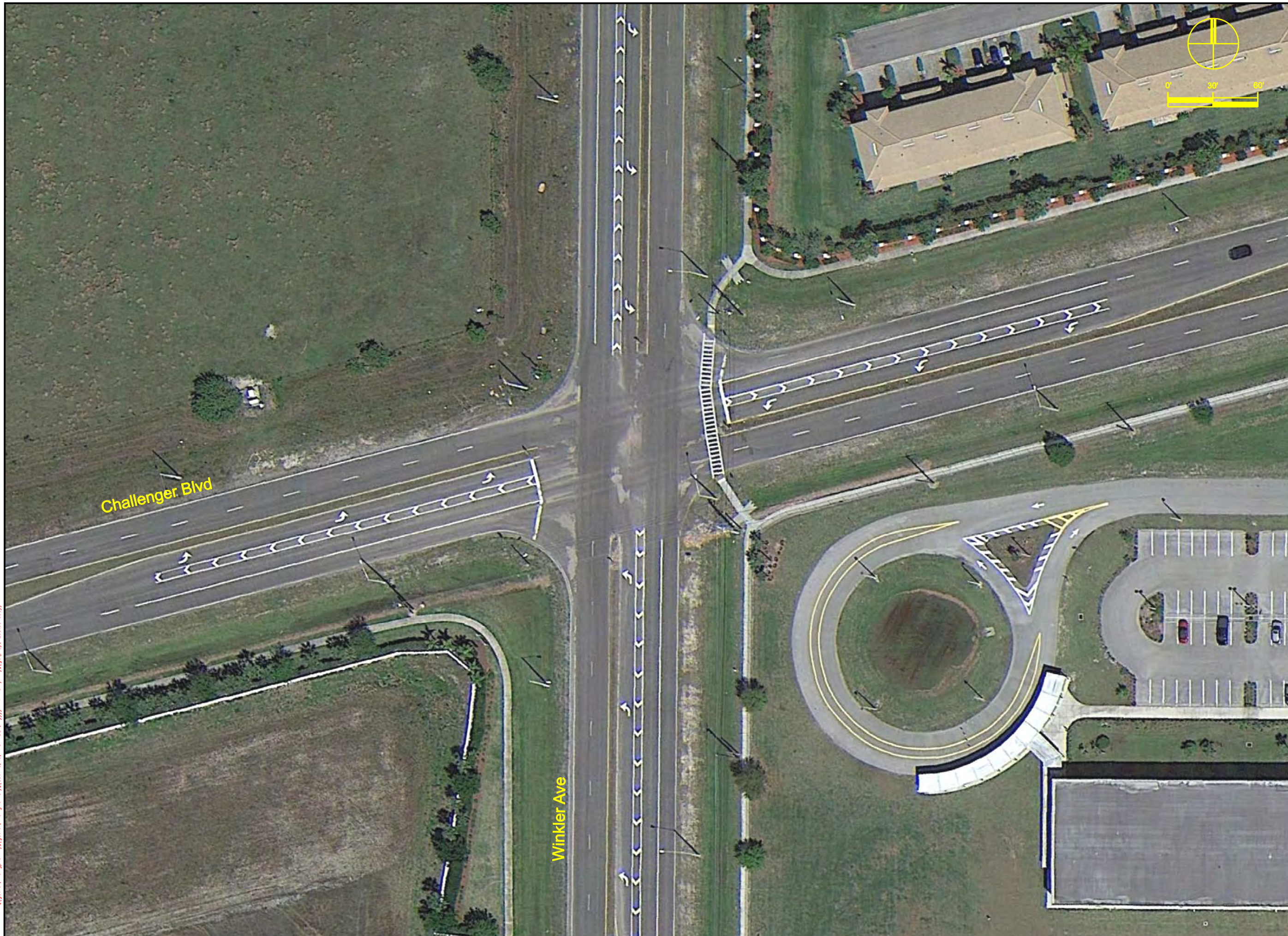
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DRAWING TITLE :  
**US 41 / M.L.K. Jr Blvd &  
Main St / McGregor**

DRAWING NO :  
**10**

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1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwalwork@comcast.net



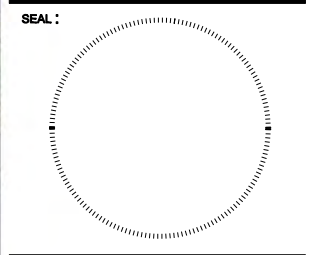
815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

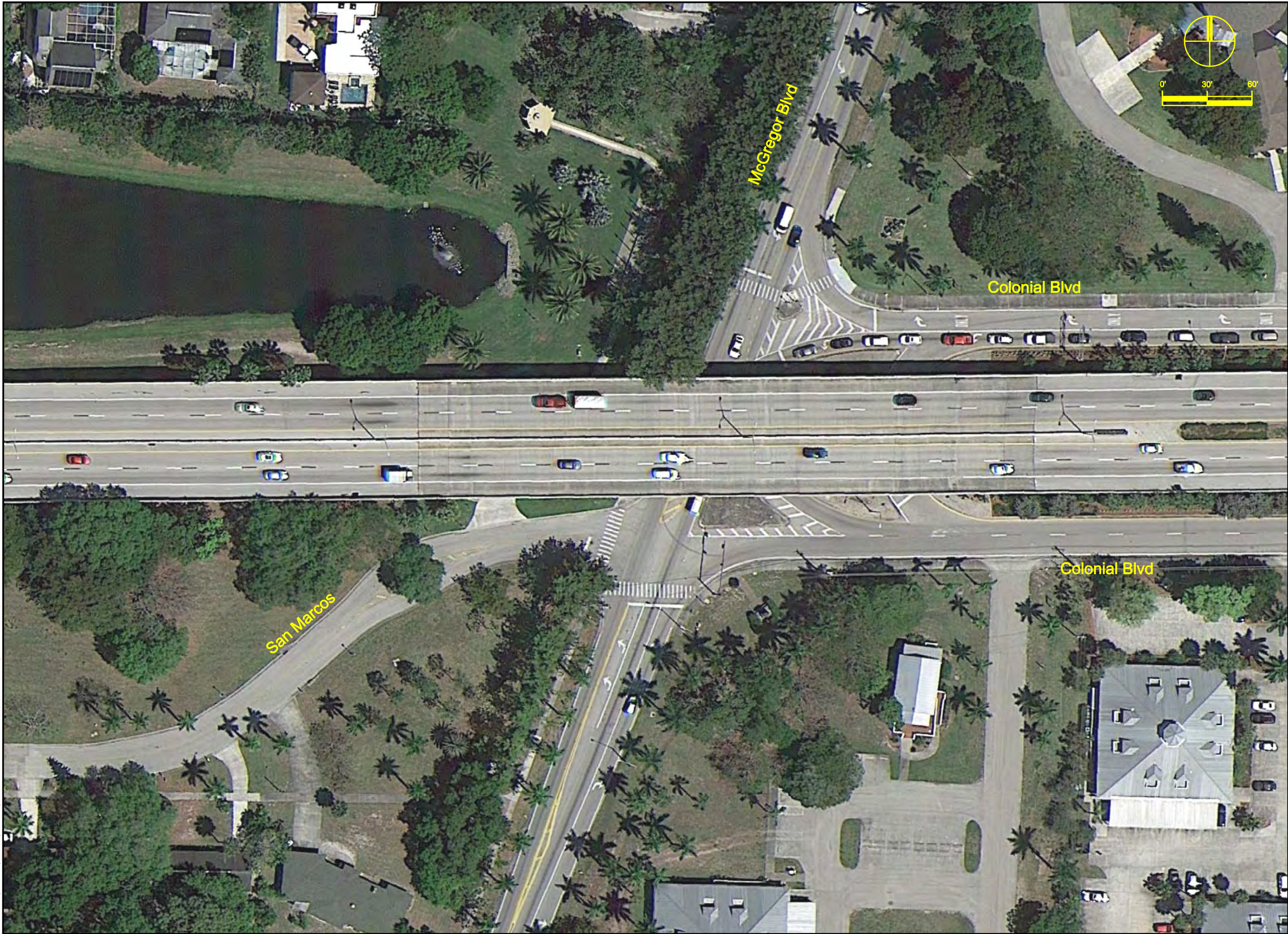
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DRAWING TITLE :  
**Winkler Ave Ext &  
Challenger Blvd**

DRAWING NO :  
**11**

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mjwalwork@comcast.net



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Cape Coral, FL 33990  
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PROJECT NAME :

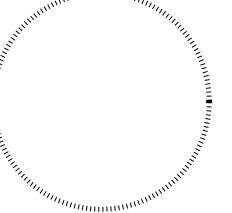
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

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SEAL :



DRAWING TITLE :

**Colonial Blvd &  
McGregor Blvd**

DRAWING NO :

**12**



\$(getvar, "swappref")\$(getvar, "orgname")\$(etime, 0, MON, DD, " 9999-HHMM/PP")\$(getprop, "lastsaveby")



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904-269-1851  
mjwalwork@comcast.net



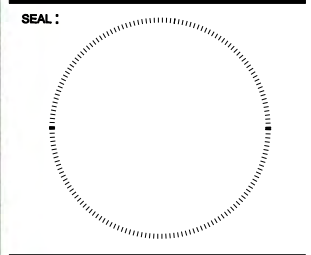
815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

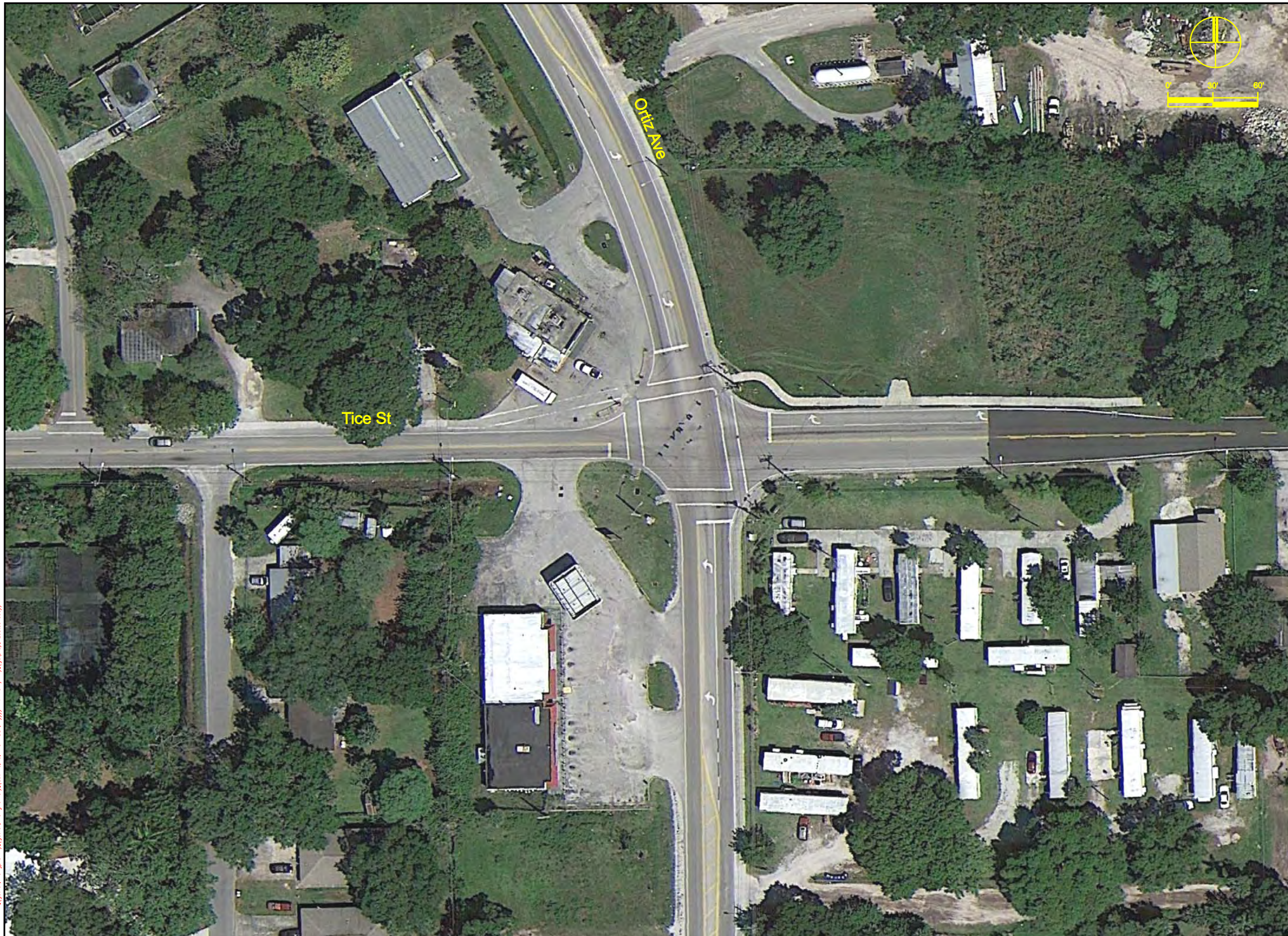
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DRAWING TITLE :  
**State Road 80 &  
New York Dr / Tice St**

DRAWING NO :  
**13**





\$(elvar, "wppref")\$(elvar, "wname")\$(eltime, "D, MON, DD", "YY")-HAMM/PO\$(elprop, "Lastoweb")



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1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwalwork@comcast.net



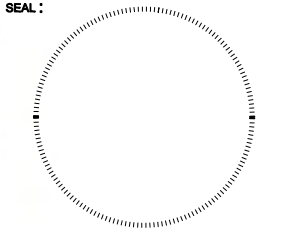
815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

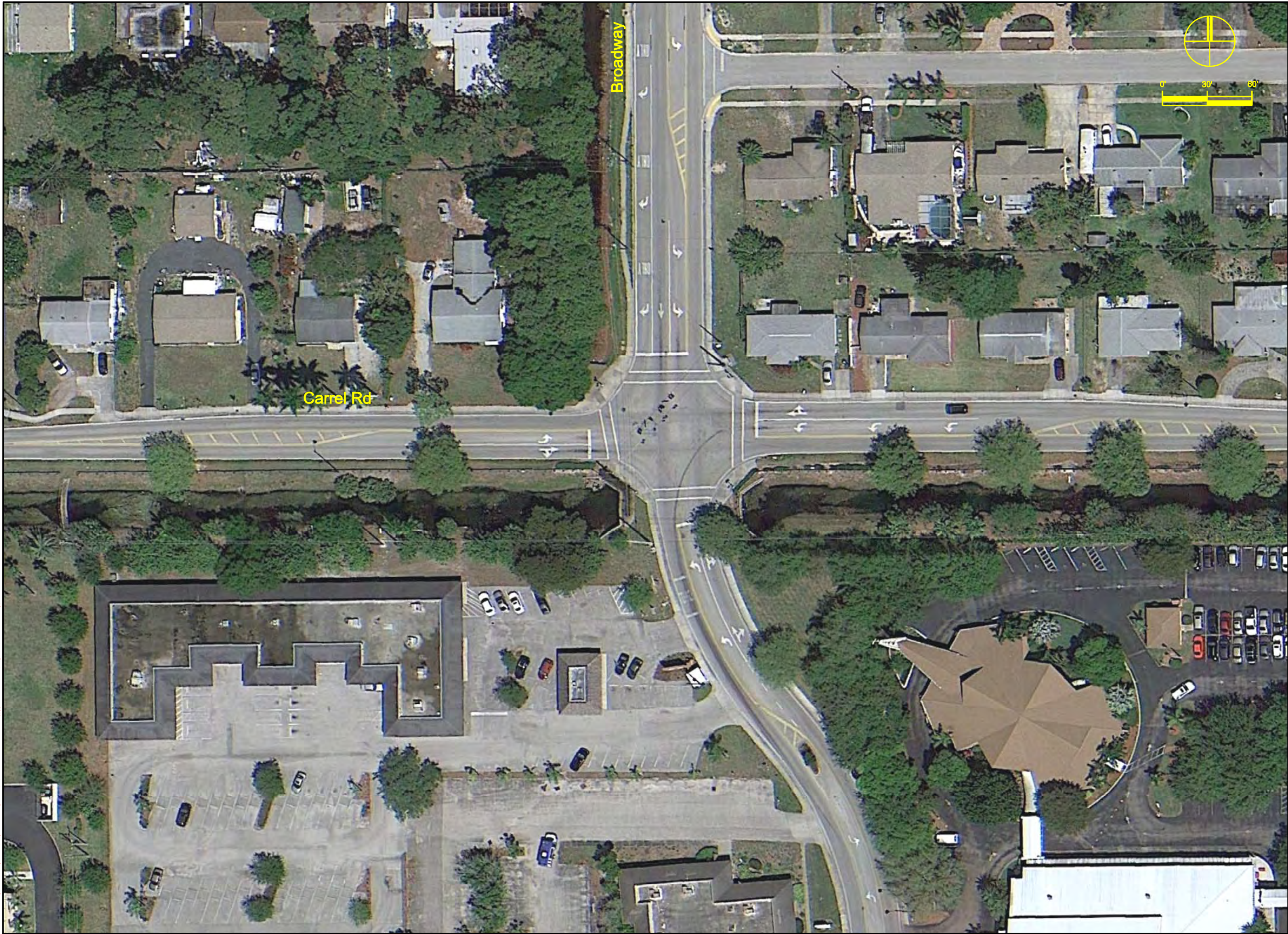
REVISIONS/SUBMISSIONS :

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DRAWING TITLE :  
**Ortiz Ave &  
Tice St**

DRAWING NO :  
**14**



\$(pvar, "wppref")\$(pvar, "wname")\$(etime, 0, MON, DD, " ", yyyy--HAMM/PO)\$(pvar, "lastsaveby")



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PROJECT NAME :

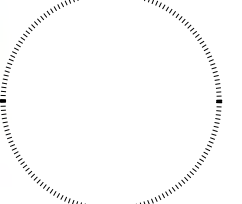
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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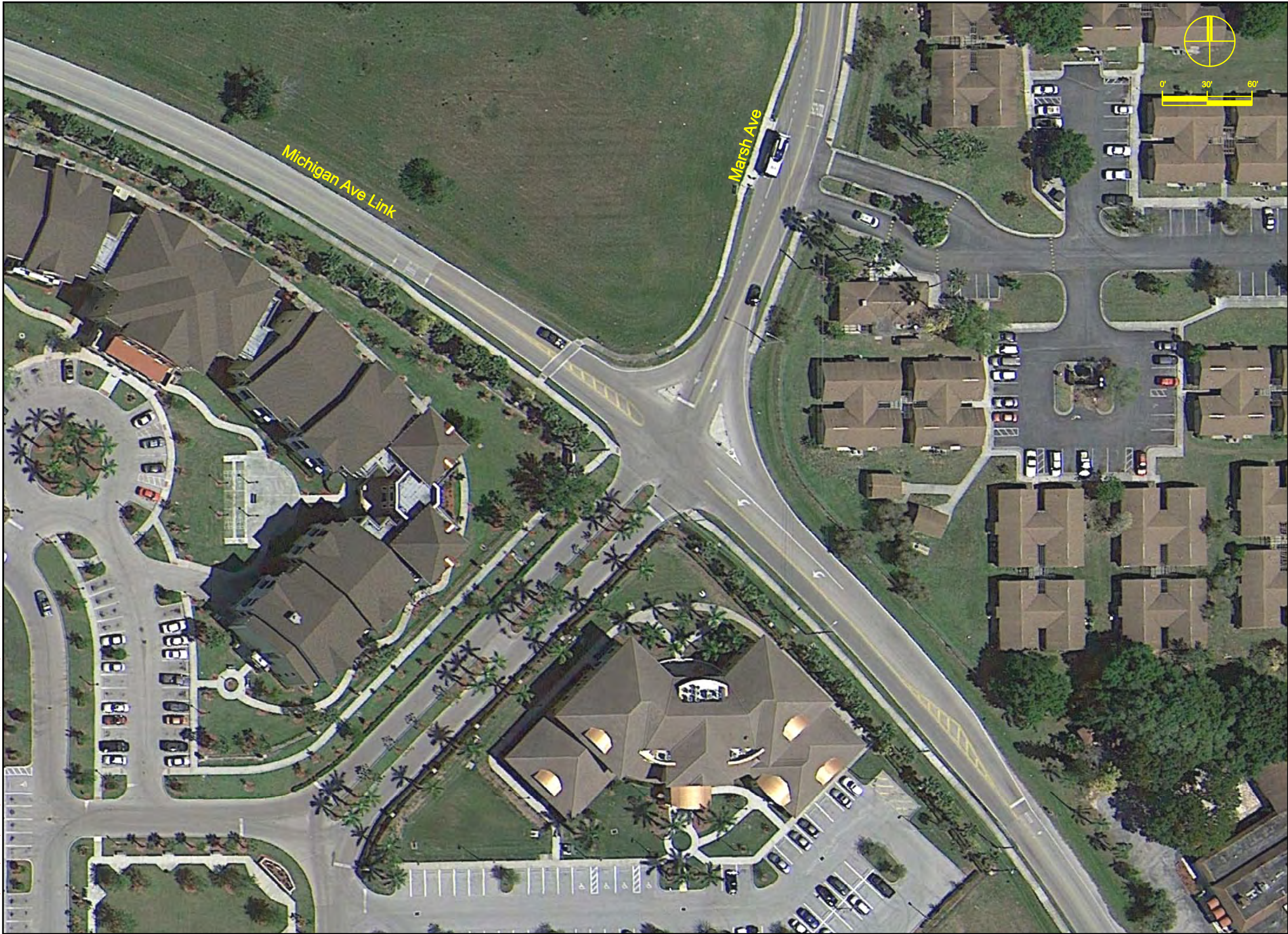


DRAWING TITLE :

**Carrel Road &  
Broadway**

DRAWING NO :

**15**



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904-269-1851  
mjwalwork@comcast.net



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PROJECT NAME :

**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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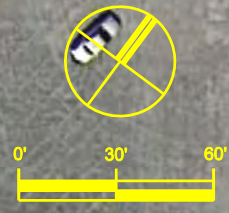
**Michigan Ave Link &  
Marsh Ave**

DRAWING NO :

**16**



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mjwalwork@comcast.net



815 Nicholas Pkwy E,  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :

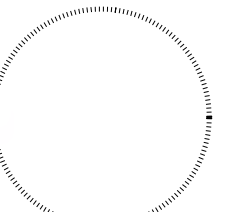
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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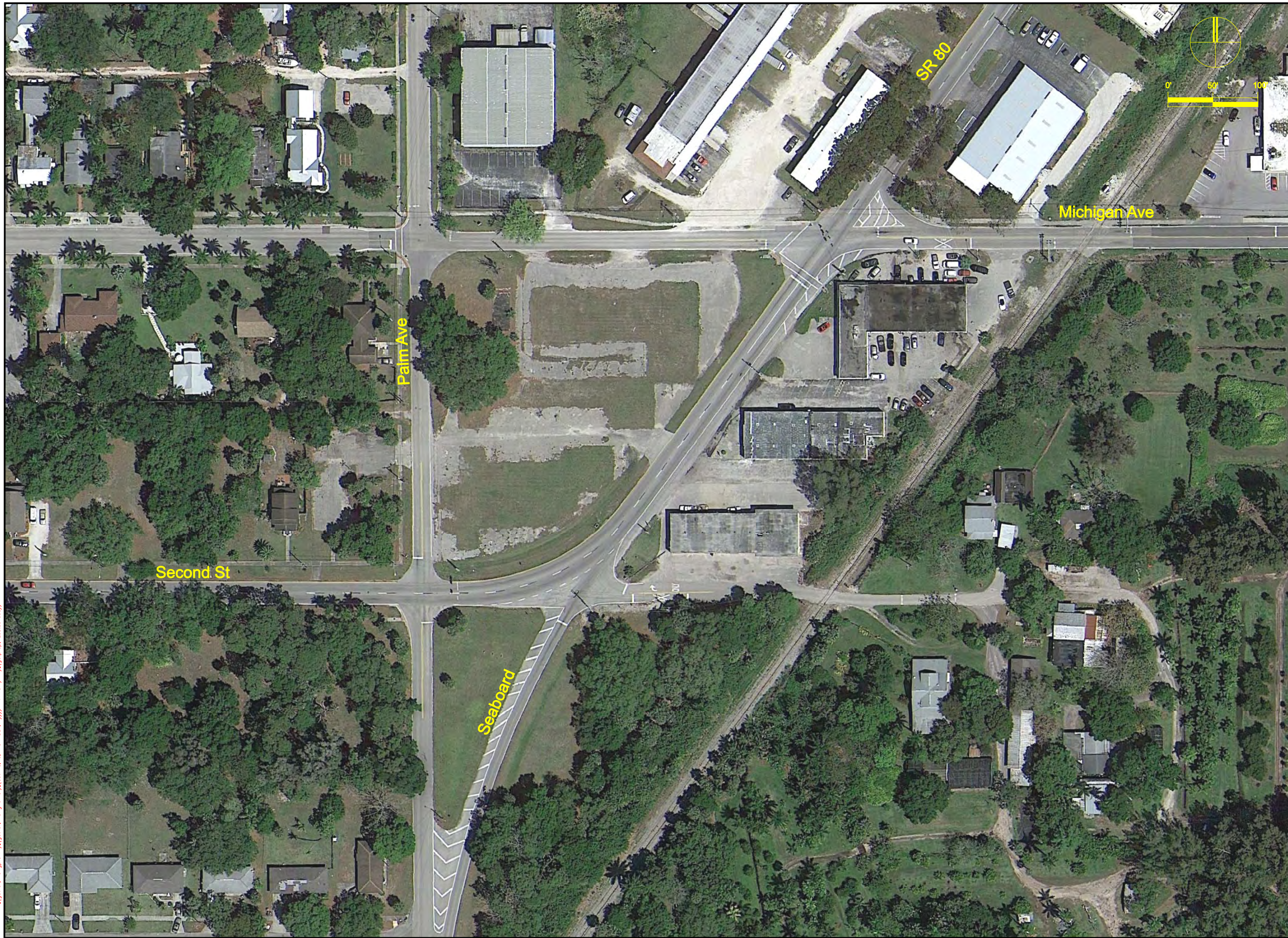


DRAWING TITLE :

**McGregor Blvd &  
Virginia Ave**

DRAWING NO :

**17**



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 1516 Plainfield Avenue, Orange Park, FL 32073  
 904-269-1851  
 mjwalwork@comcast.net



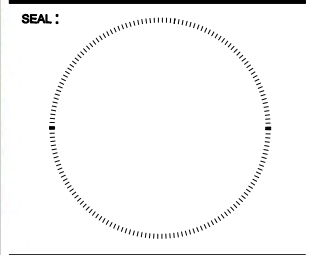
815 Nicholas Pkwy E,  
 Cape Coral, FL 33990  
 (239) 244-2220  
 www.leempo.com

PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
 DATE : 11/03/2015  
 CAD FILE NO :  
 AGENCY NO :

REVISIONS/SUBMISSIONS :

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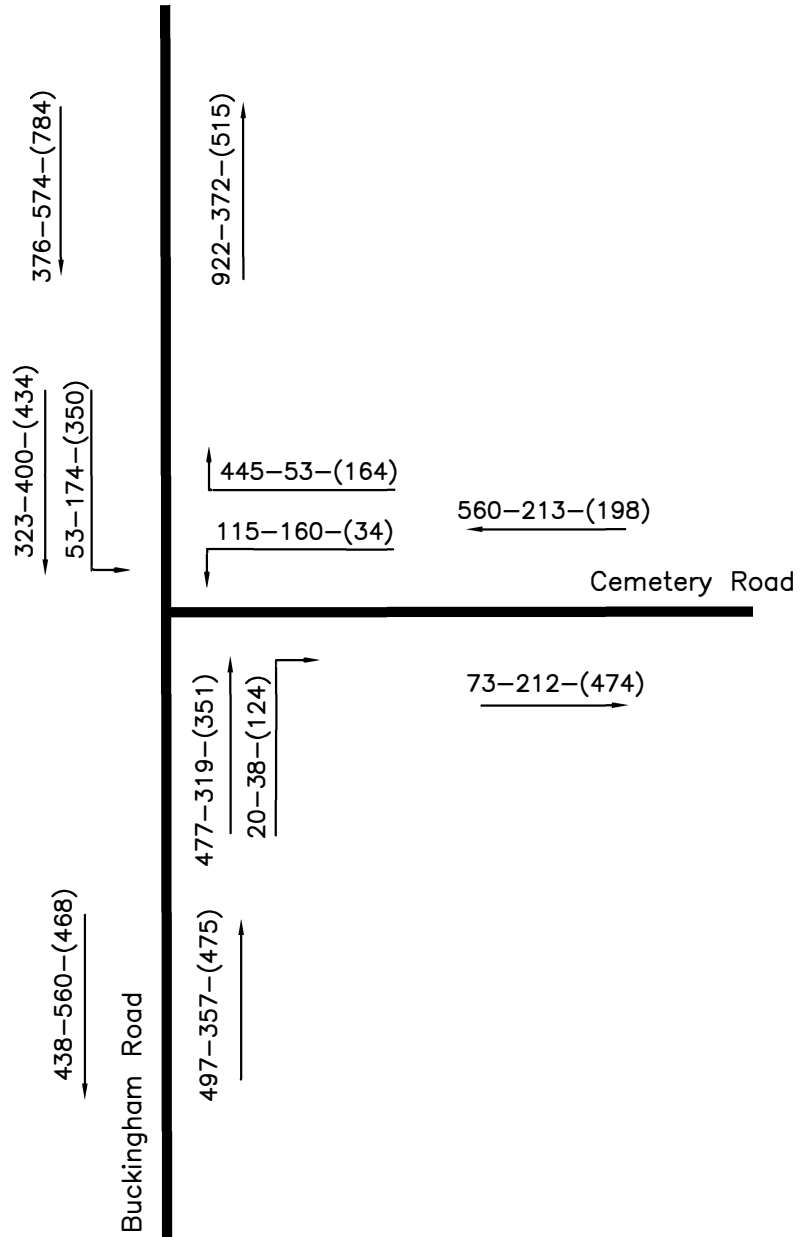
DRAWING TITLE :  
**SR 80 / Seaboard &  
Second St**

DRAWING NO :  
**18**

**APPENDIX B**  
**EXISTING AND FUTURE TURN VOLUMES**

**Existing 2015 Turn Volumes**

# 1. Buckingham Road / Cemetery Road



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak



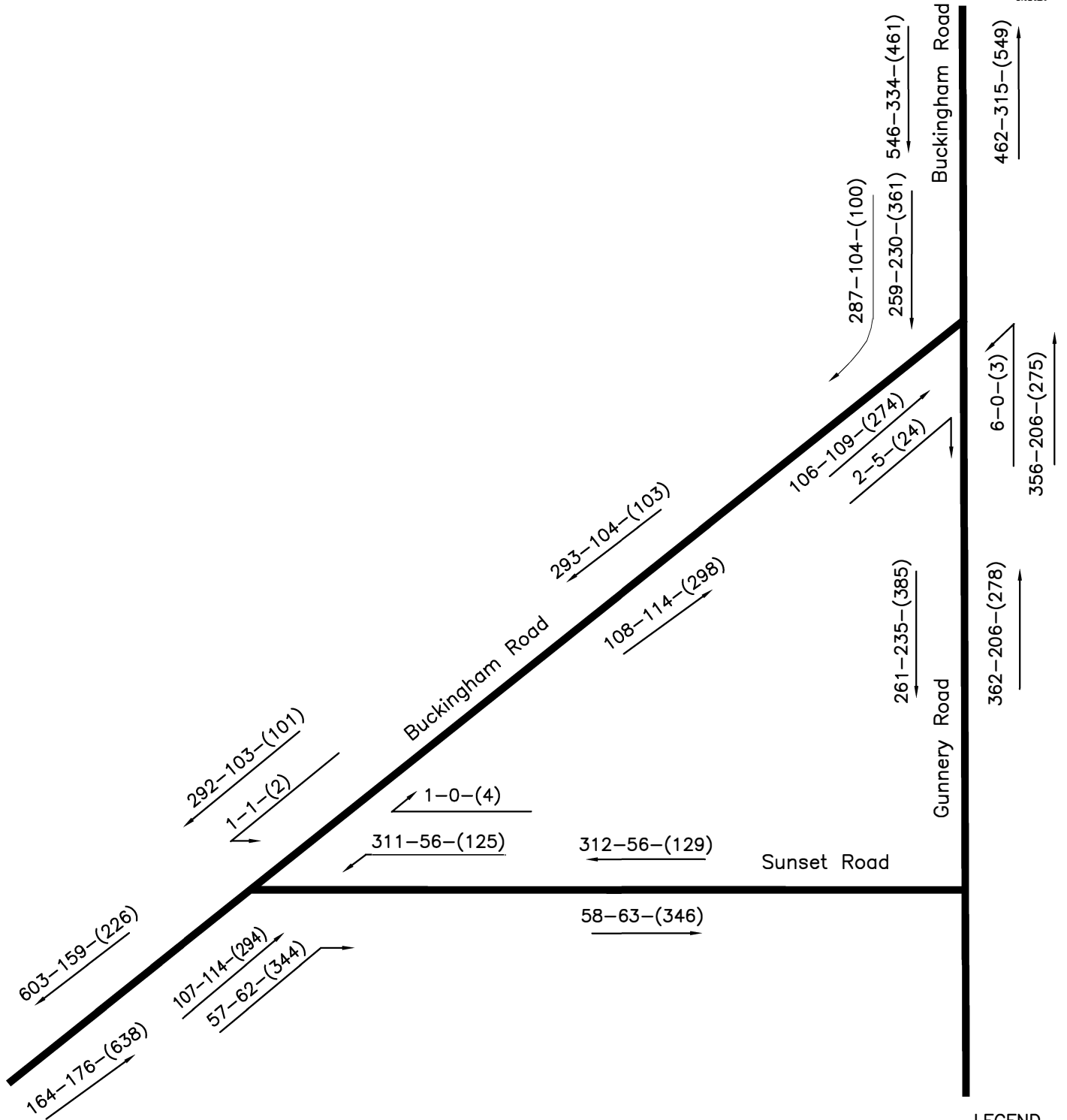
LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/01B/0116



## 2. Buckingham Road / Gunnery Road



**LEGEND**

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

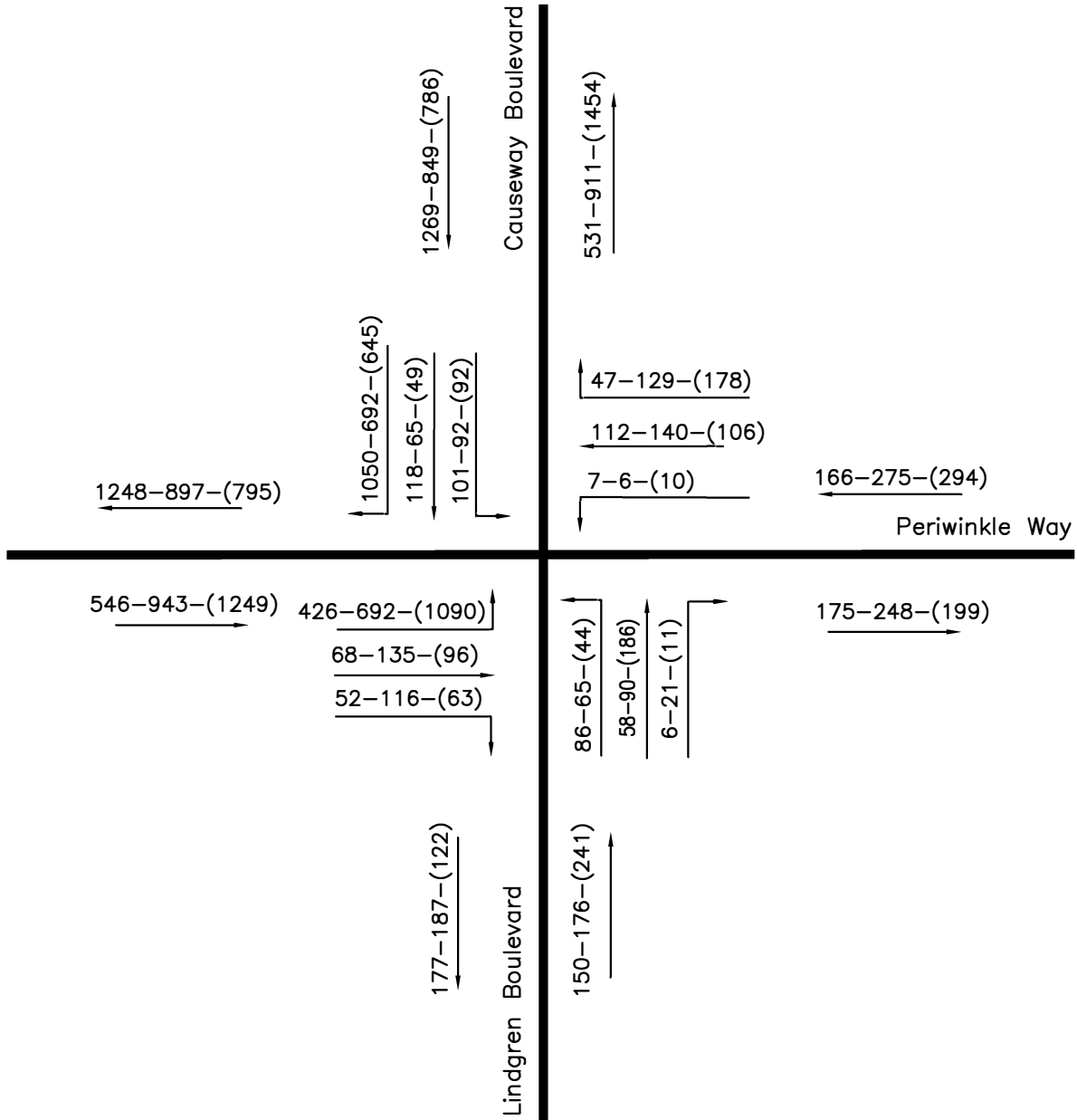


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/02A/1215

### 3. Periwinkle Way / Causeway Boulevard / Lindgren Boulevard



**LEGEND**

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

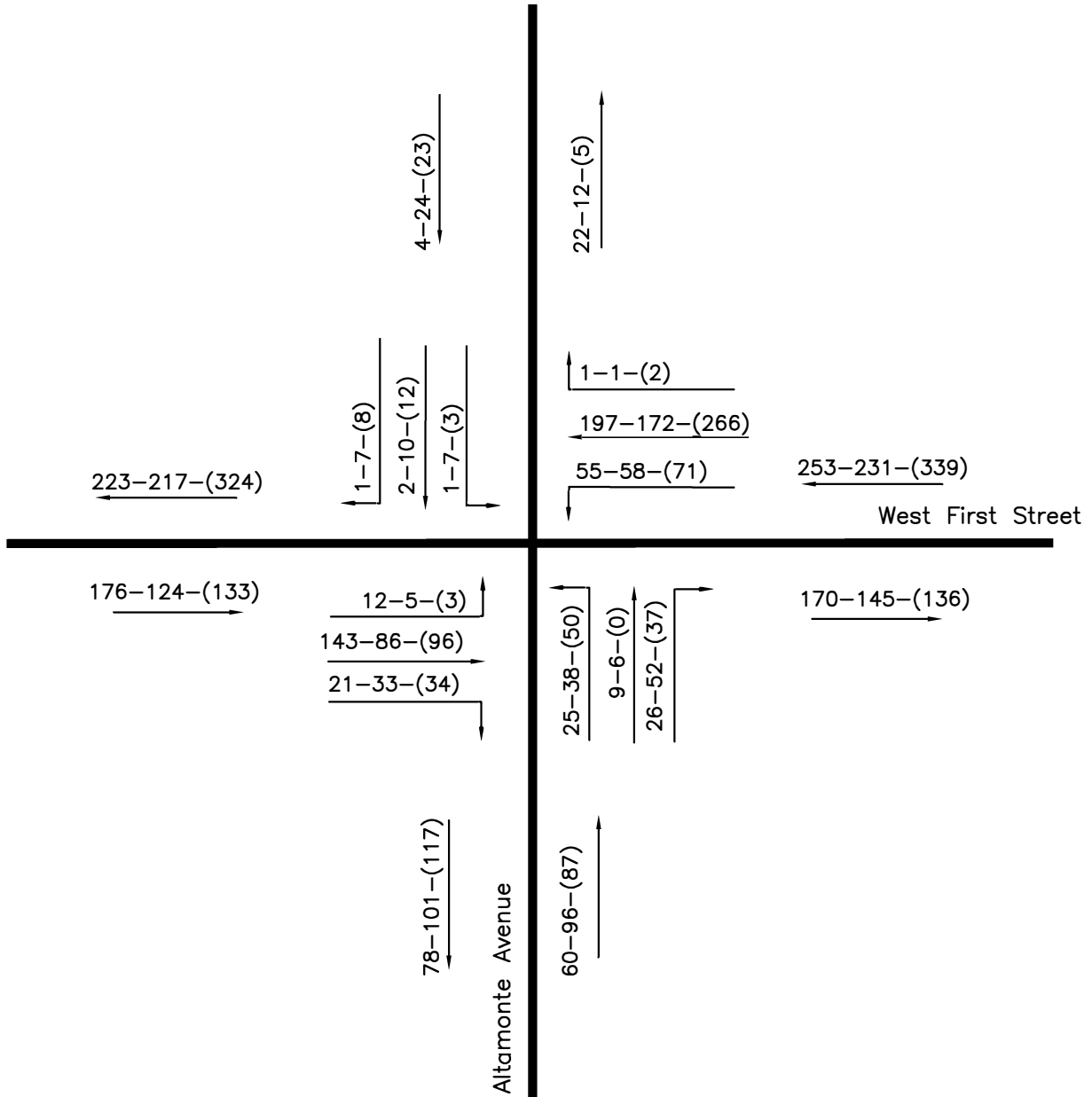


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/03B/0116

# 4. West First Street / Altamonte Avenue



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

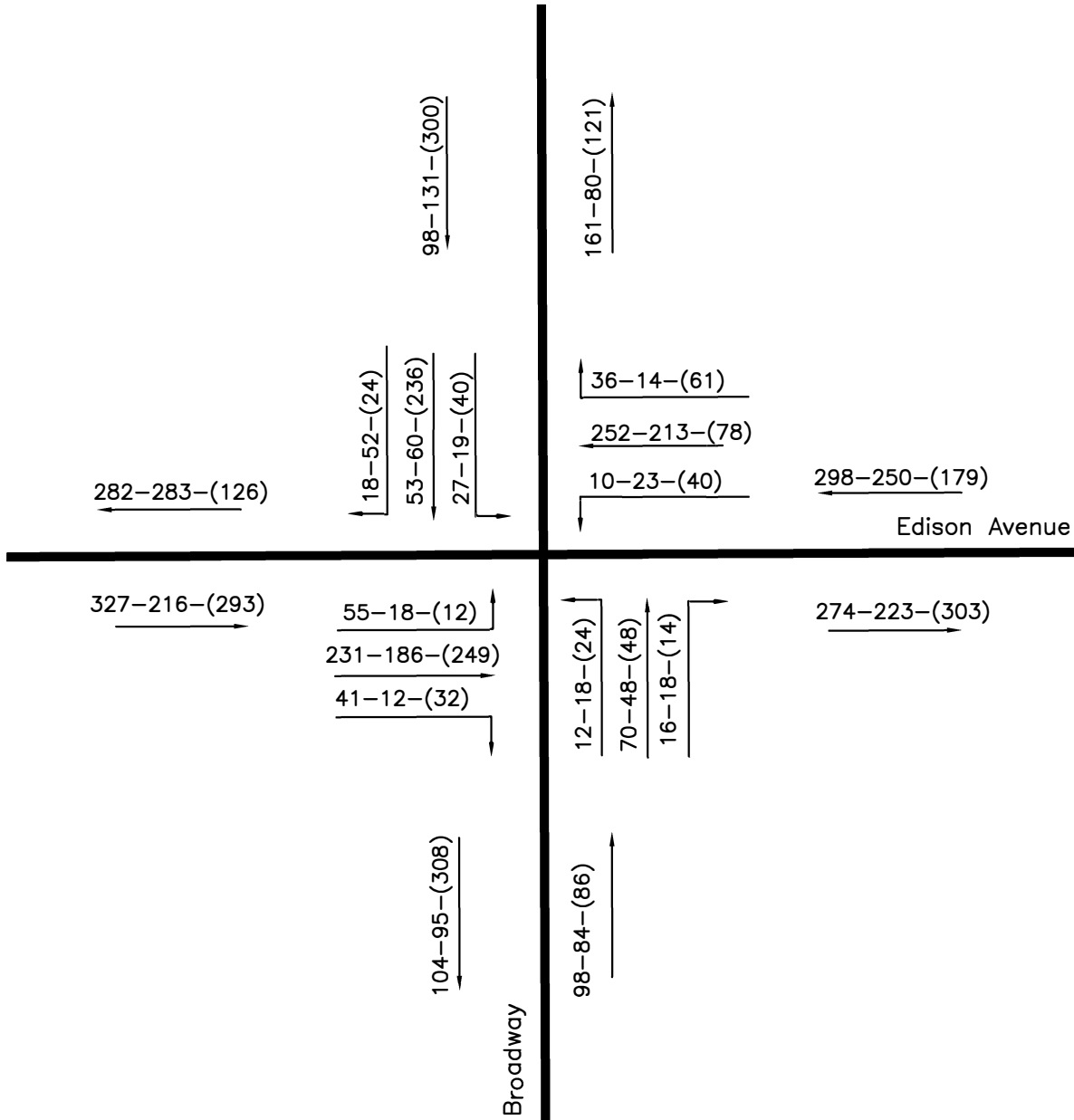


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/04B/0116

# 5. Edison Avenue / Broadway



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

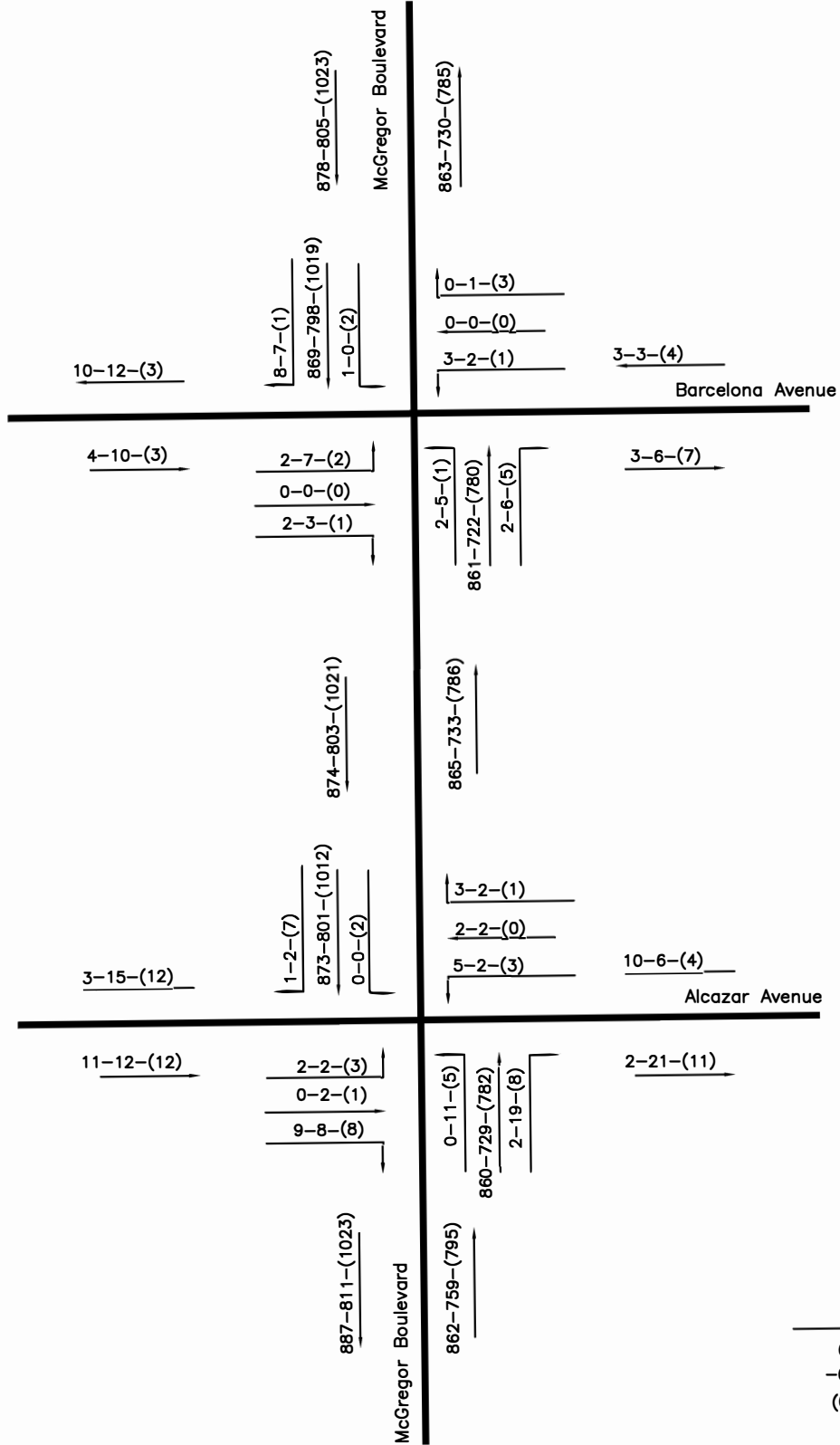


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/05A/1215

# 6. McGregor Boulevard / Barcelona Avenue / Alcazar Avenue



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

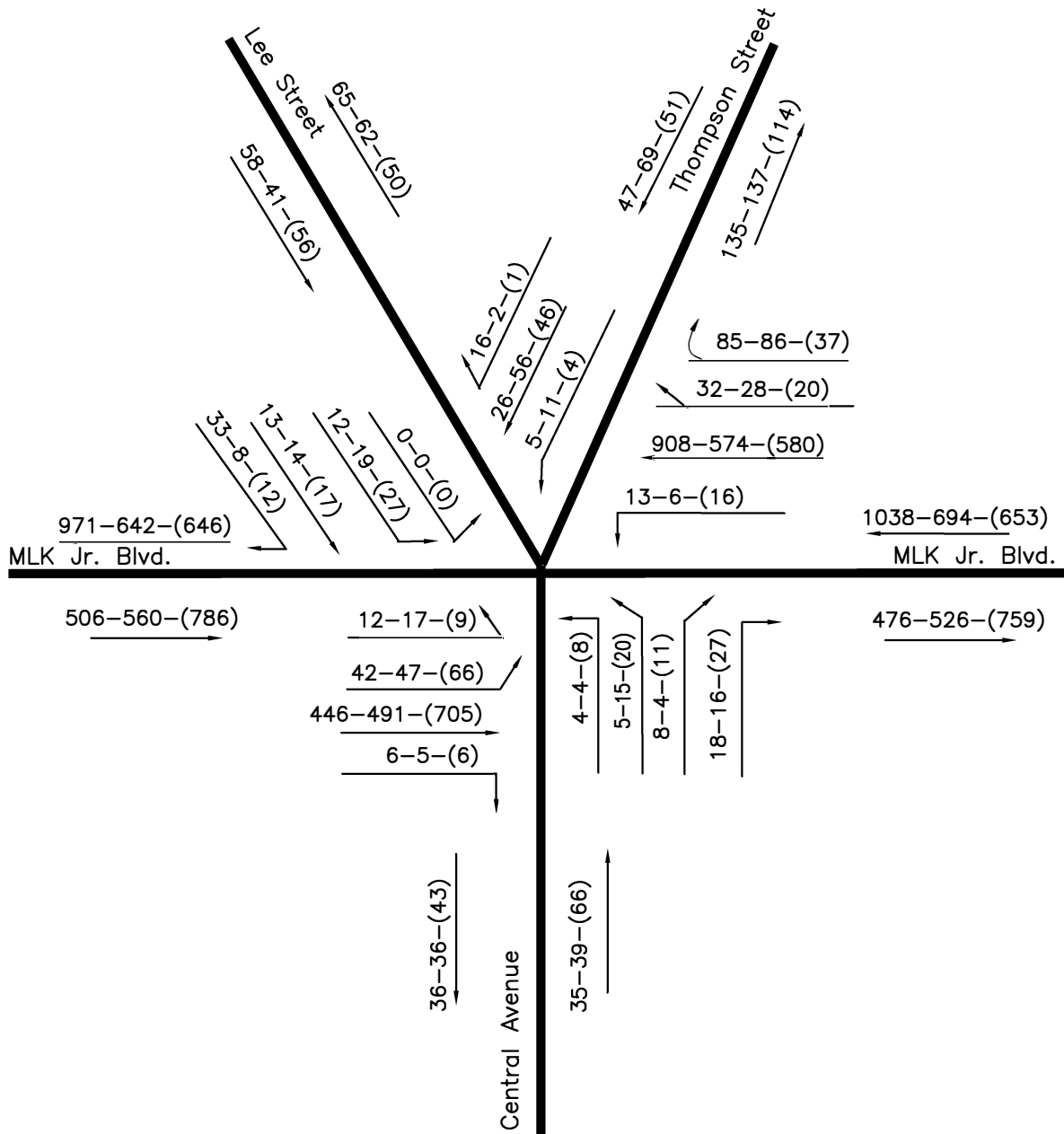
14504/06B/0116



LEE COUNTY MPO  
ROUNDAABOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

# 7. MLK Boulevard/Lee Street/Central Avenue/Thompson Street



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

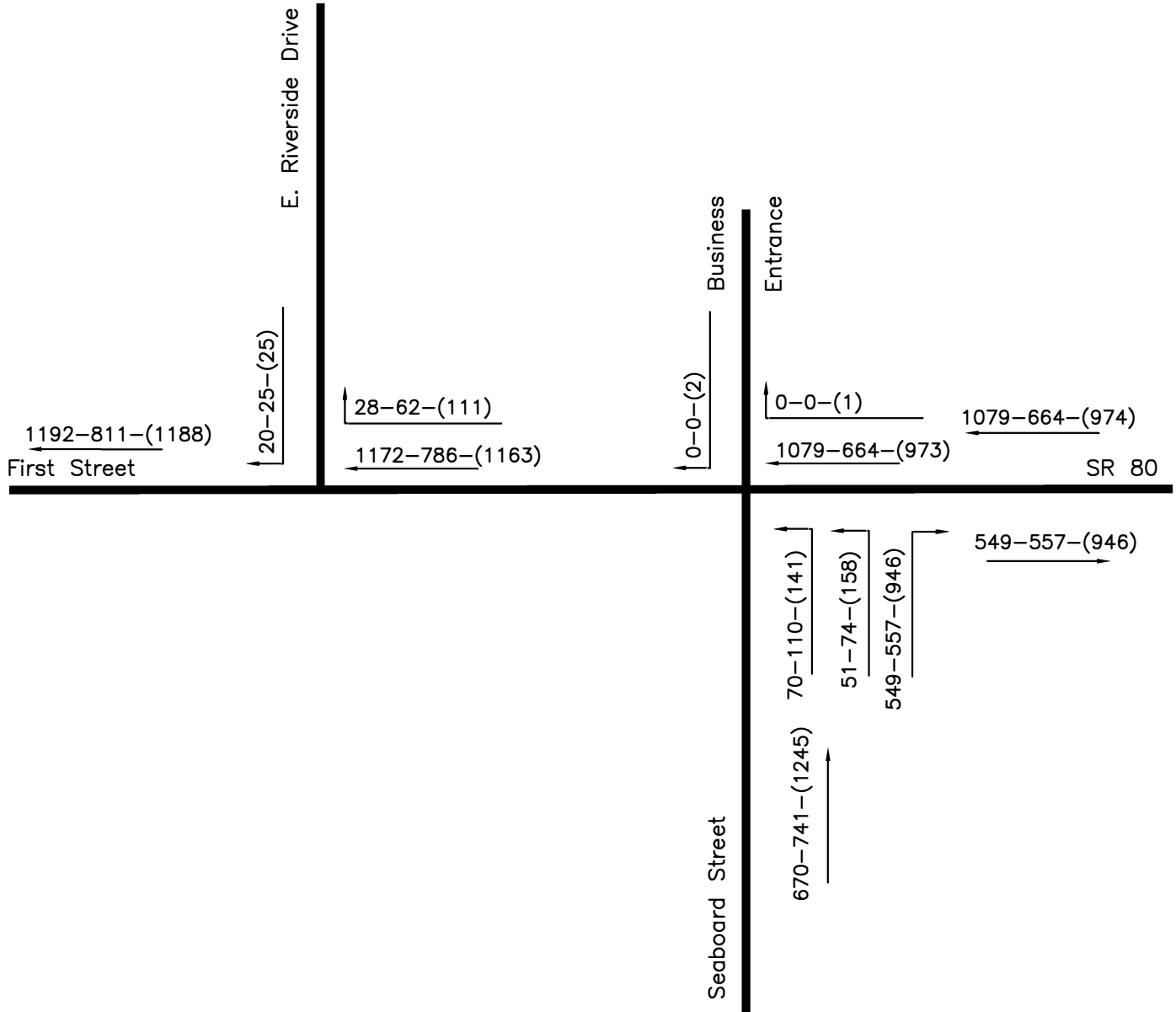


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/07A/1215

# 8. First Street / SR 80 / Seaboard Street



LEGEND	
00	AM Peak
-00-	Mid-Day Peak
(00)	PM Peak

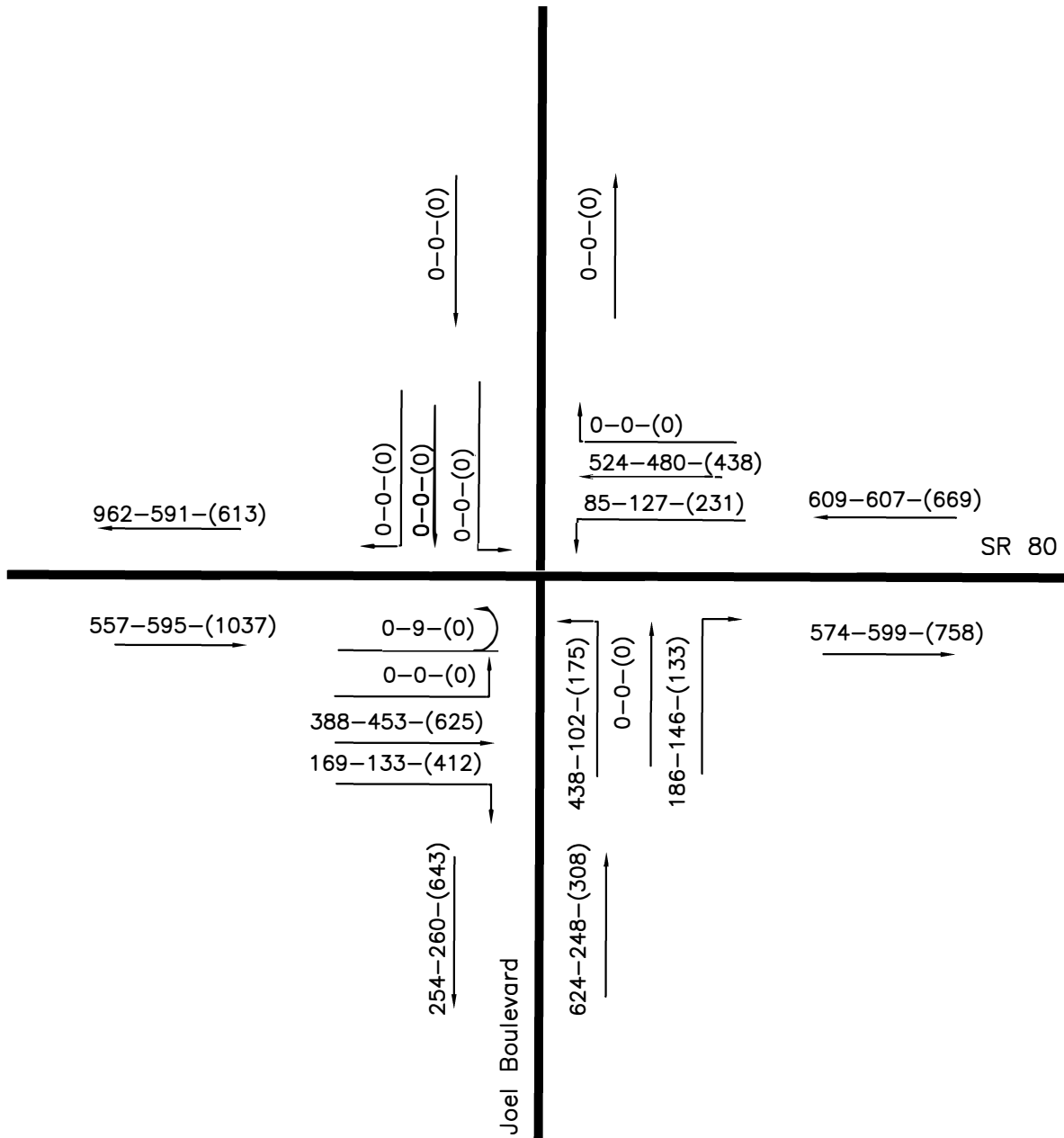


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/08A/1215

# 9. SR 80 / Joel Boulevard



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak



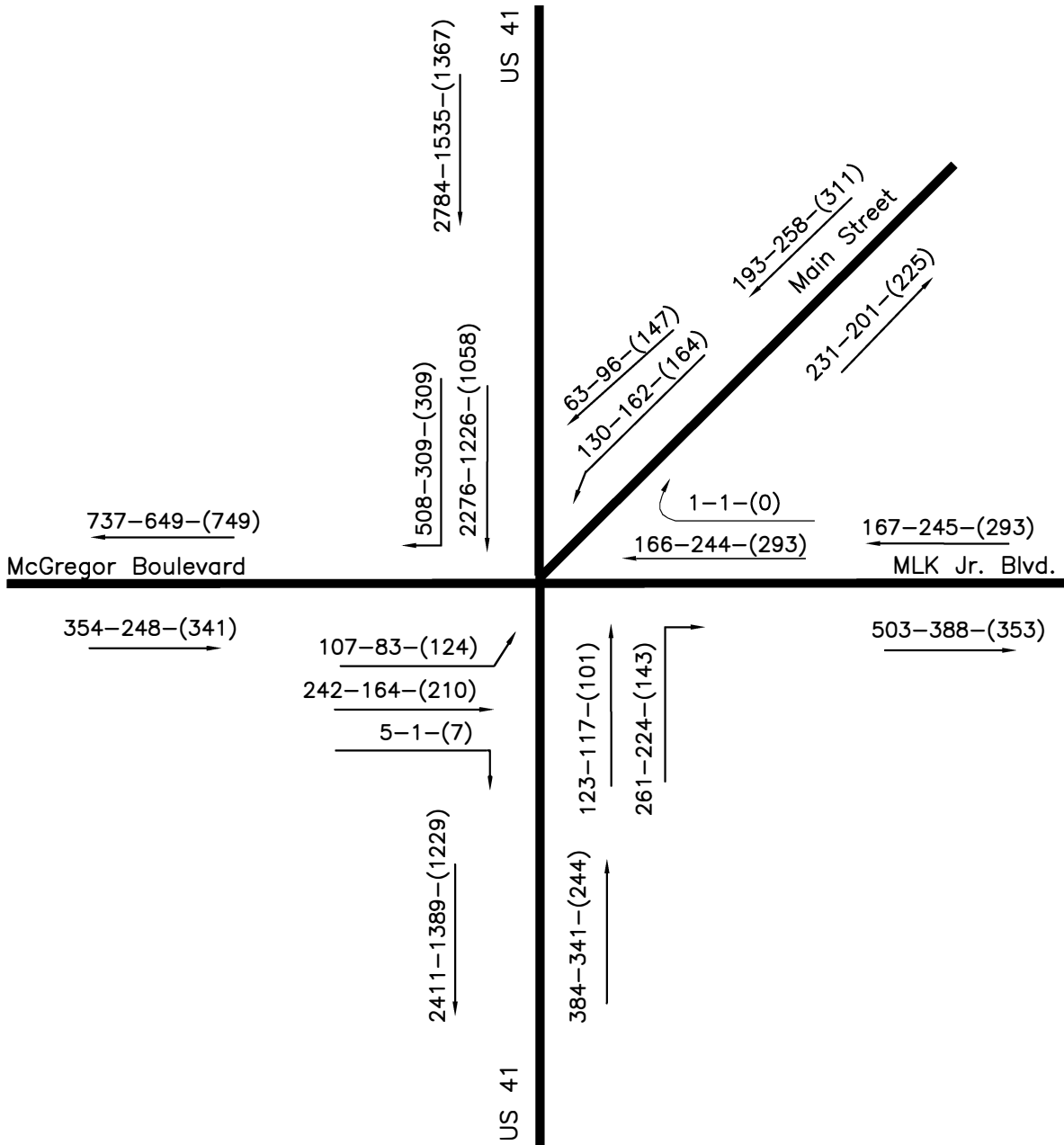
LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/09B/0116



# 10. US 41/MLK Jr. Boulevard/McGregor Boulevard/Main Street



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

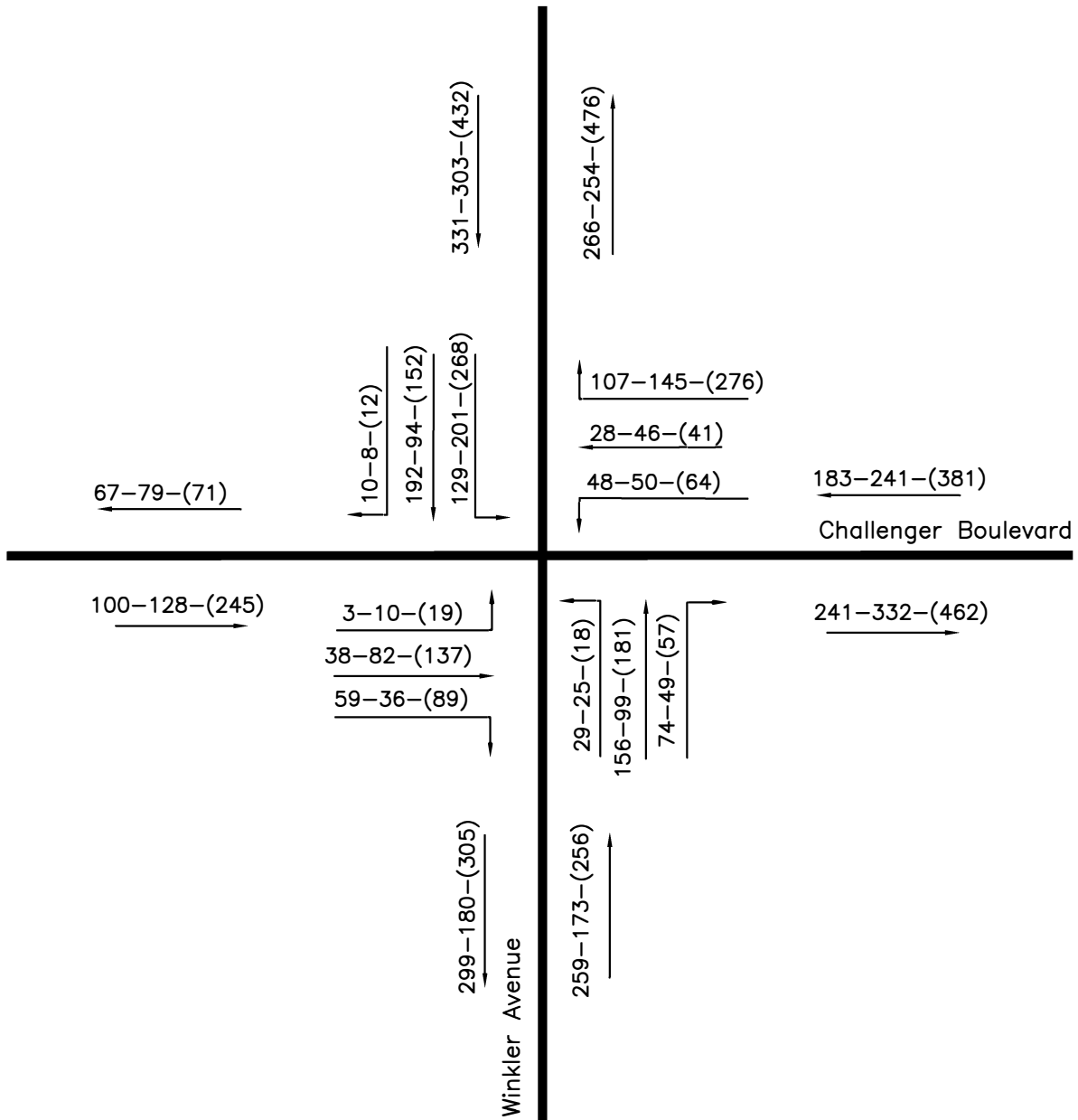


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/10A/1215

# 11. Winkler Avenue / Challenger Boulevard



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

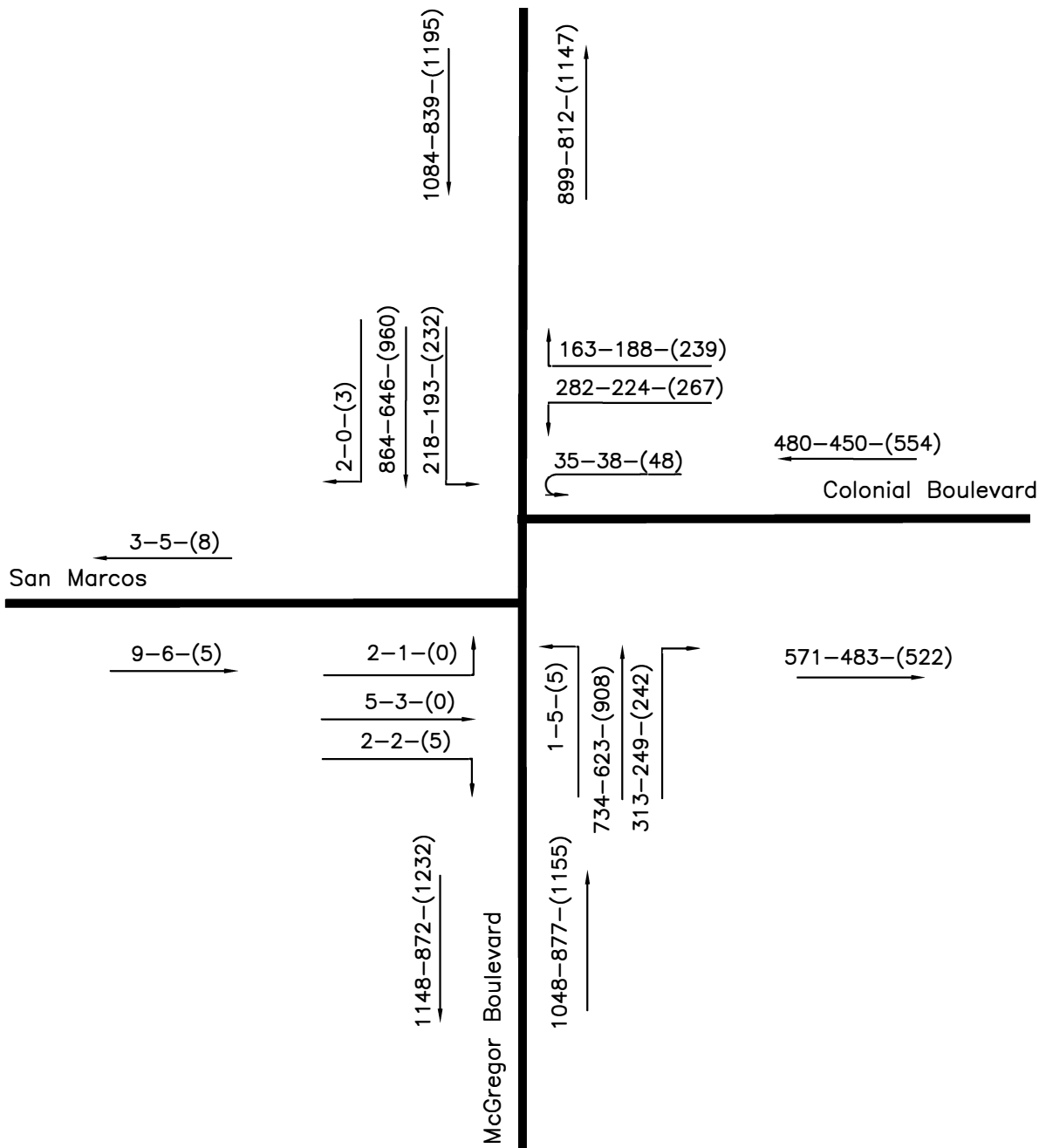


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/11A/1215

# 12. Colonial Boulevard / McGregor Boulevard



LEGEND

00	AM Peak
-00-	Mid-Day Peak
(00)	PM Peak

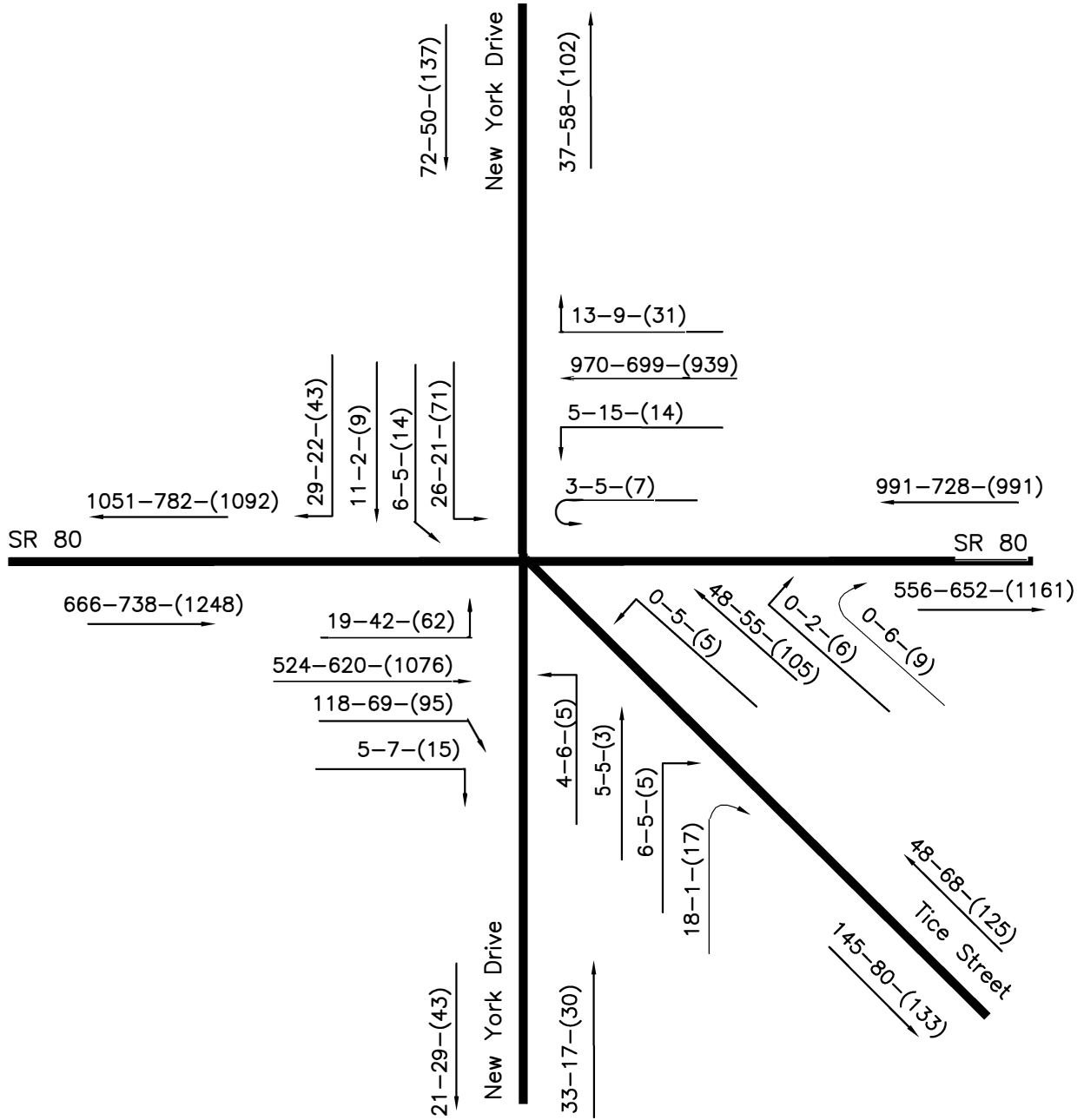


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/12B/1316

# 13. SR 80 / New York Drive / Tice Street



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

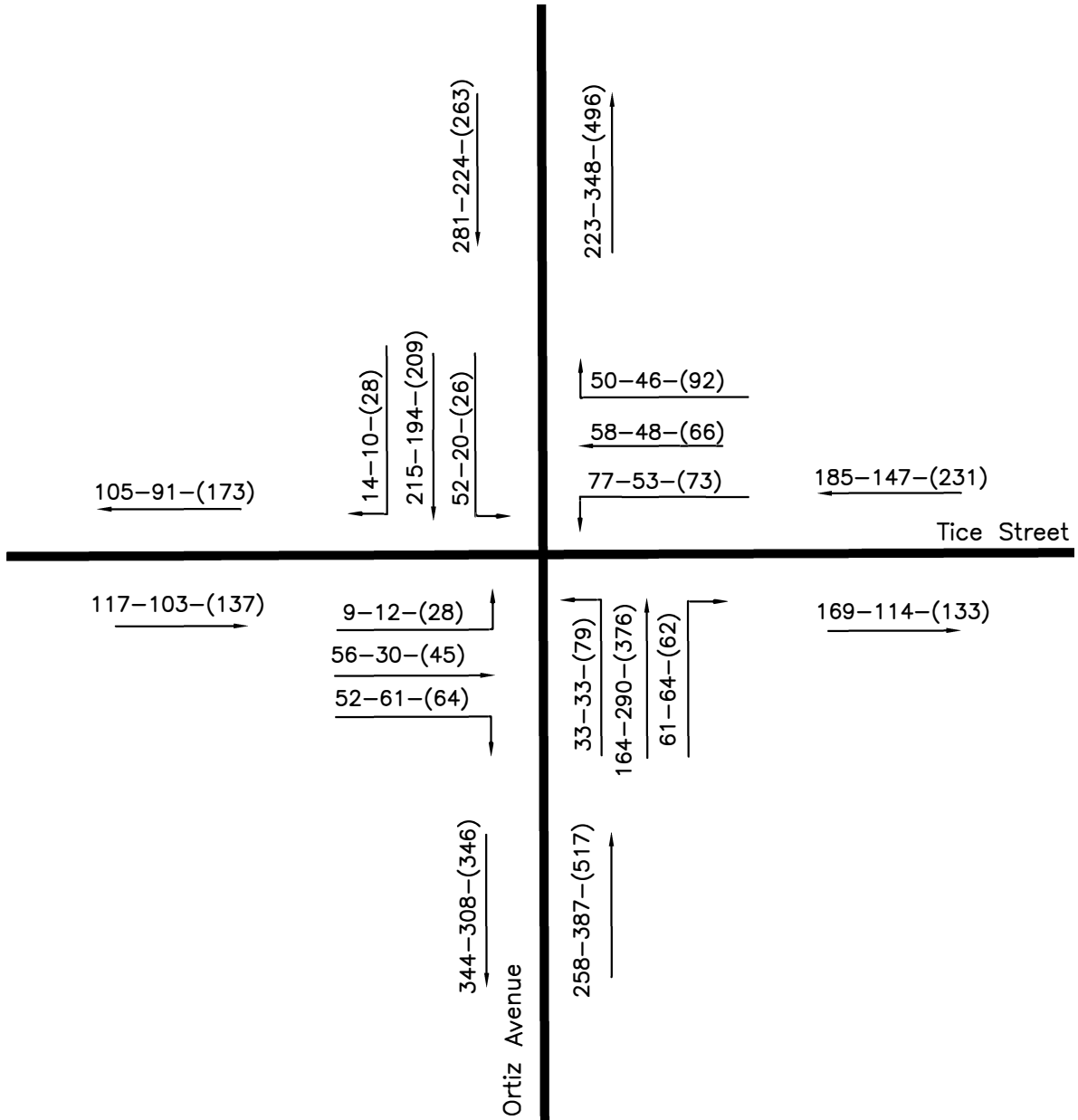


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/13A/1215

# 14. Ortiz Avenue / Tice Street



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

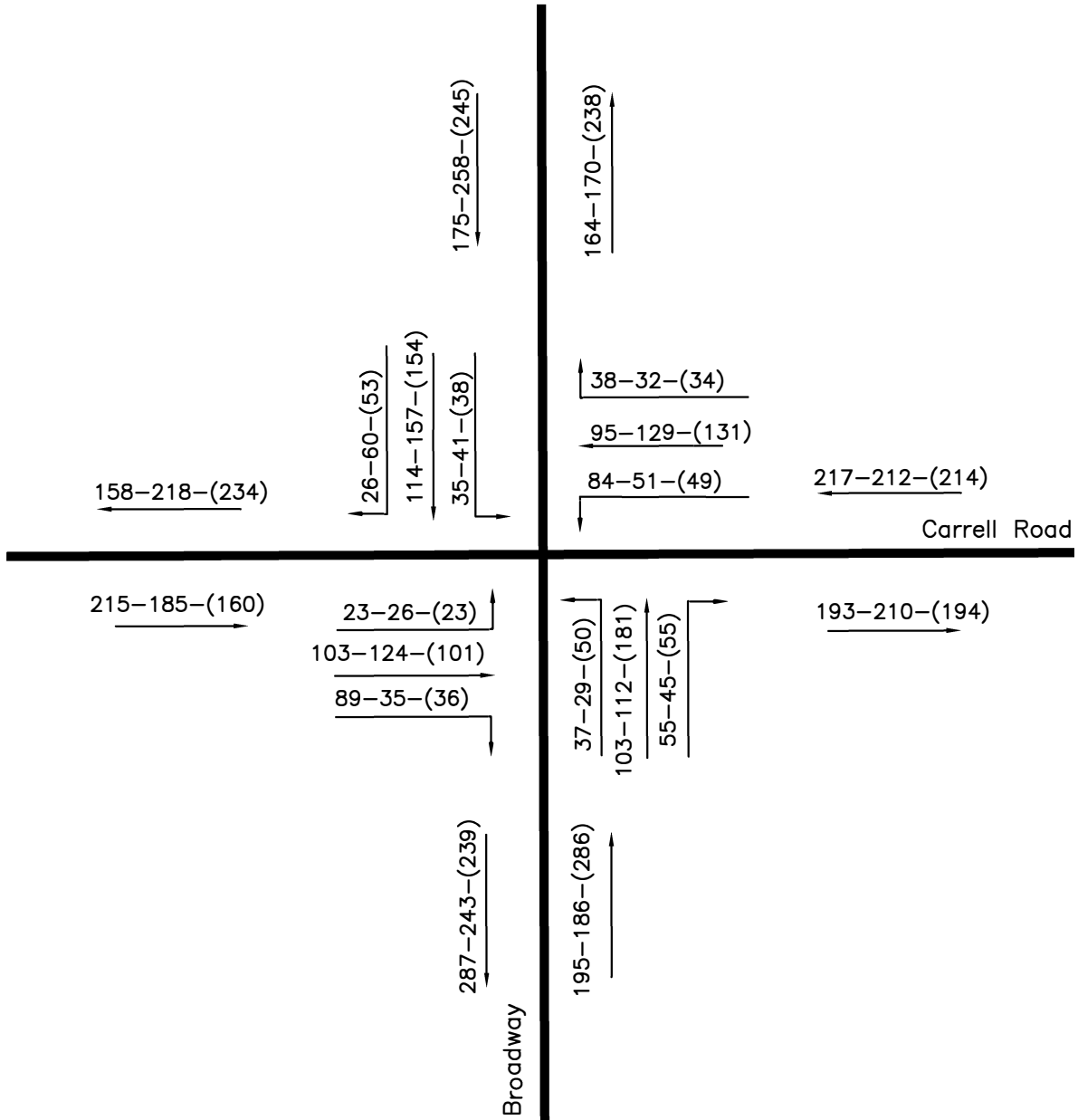


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/14A/1215

# 15. Broadway / Carrell Road



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

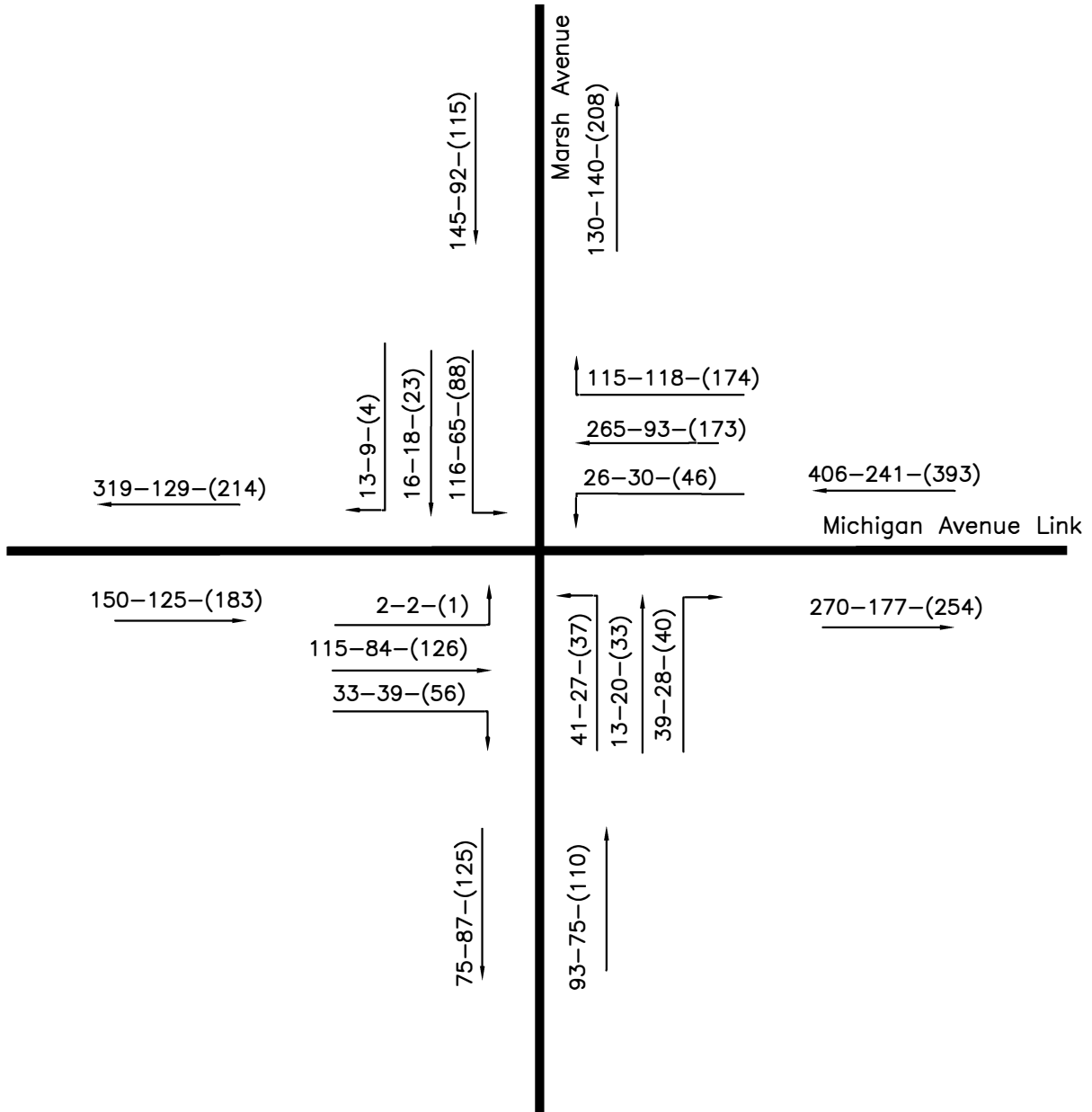


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/15A/1215

# 16. Michigan Avenue Link / Marsh Avenue



**LEGEND**

00	AM Peak
-00-	Mid-Day Peak
(00)	PM Peak

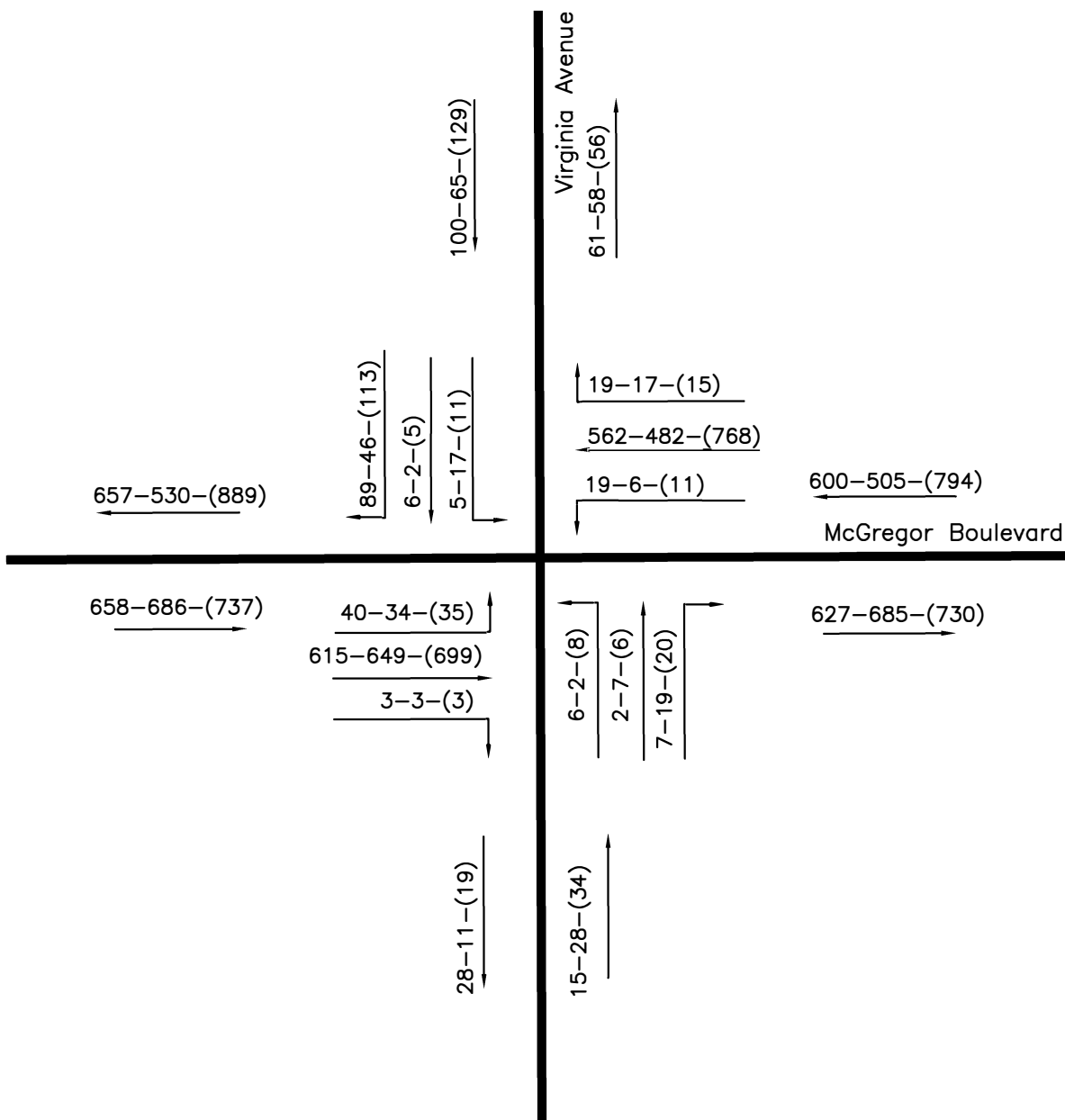


LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/16A/1215

# 17. McGregor Boulevard / Virginia Avenue



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak



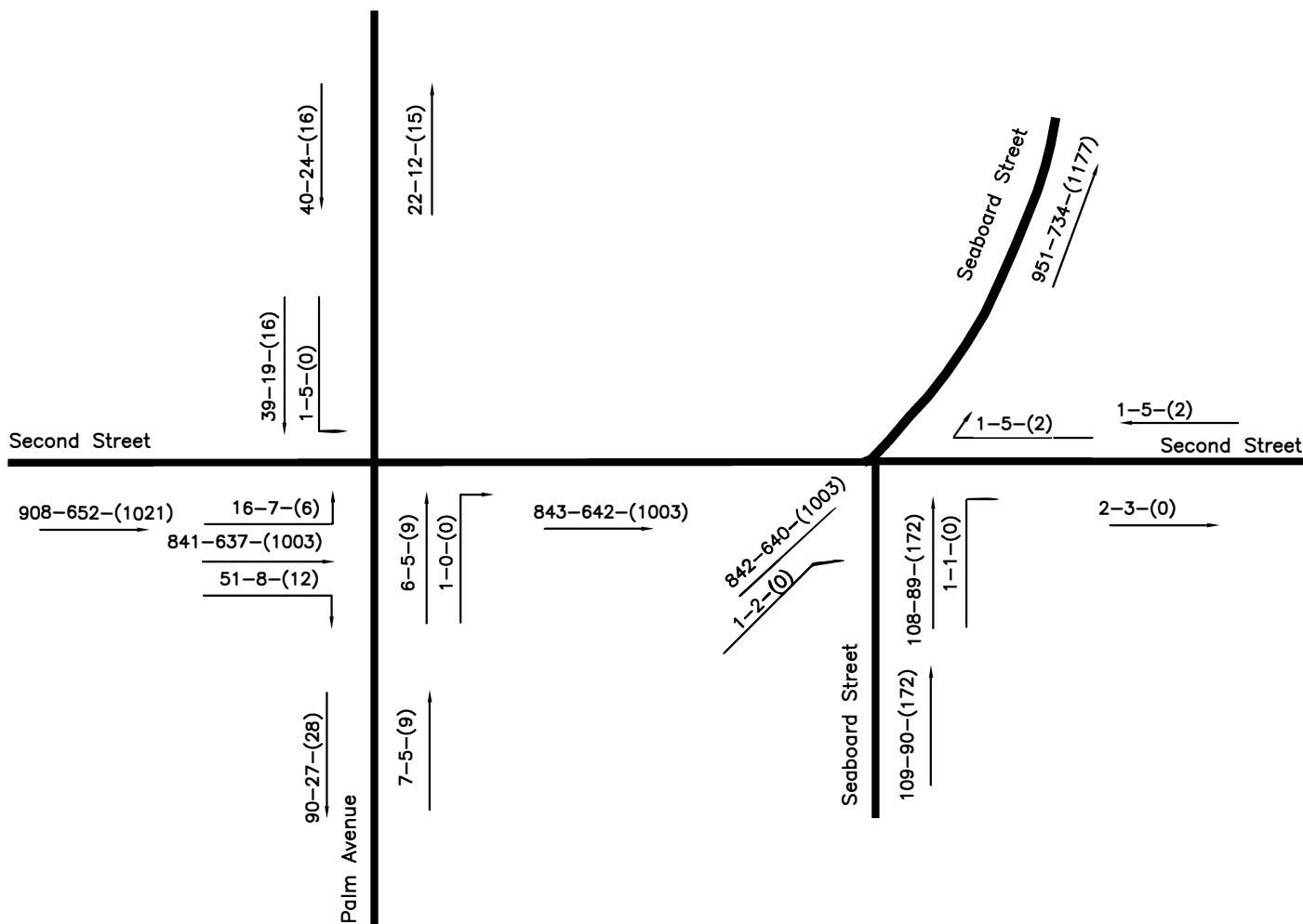
LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/17A/1215



# 18. Second Street / Palm Avenue



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak



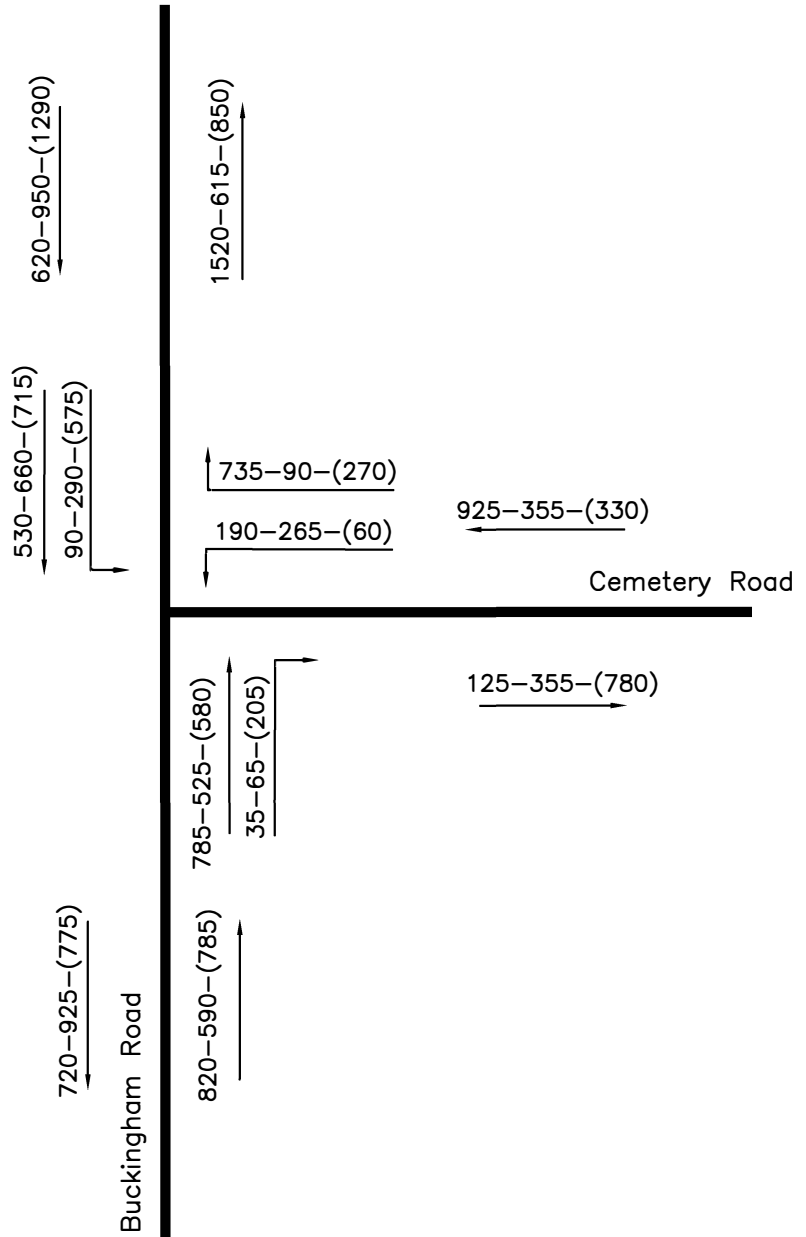
LEE COUNTY MPO  
ROUNDBOUT STUDY

EXISTING 2015  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/18A/1215

**Future 2040 Turn Volumes**

# 1. Buckingham Road / Cemetery Road



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

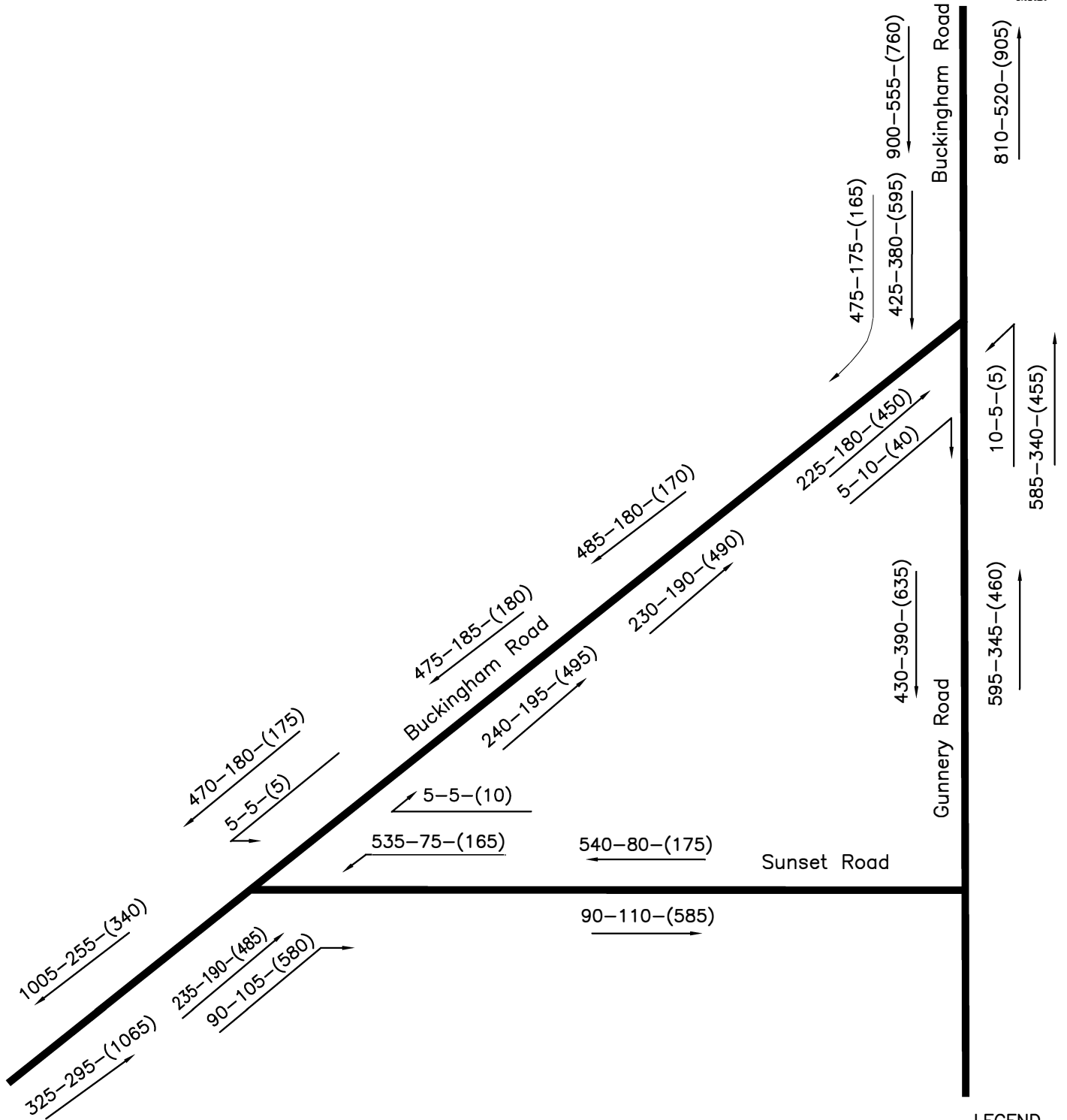


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/01B/0116

## 2. Buckingham Road / Gunnery Road



**LEGEND**

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

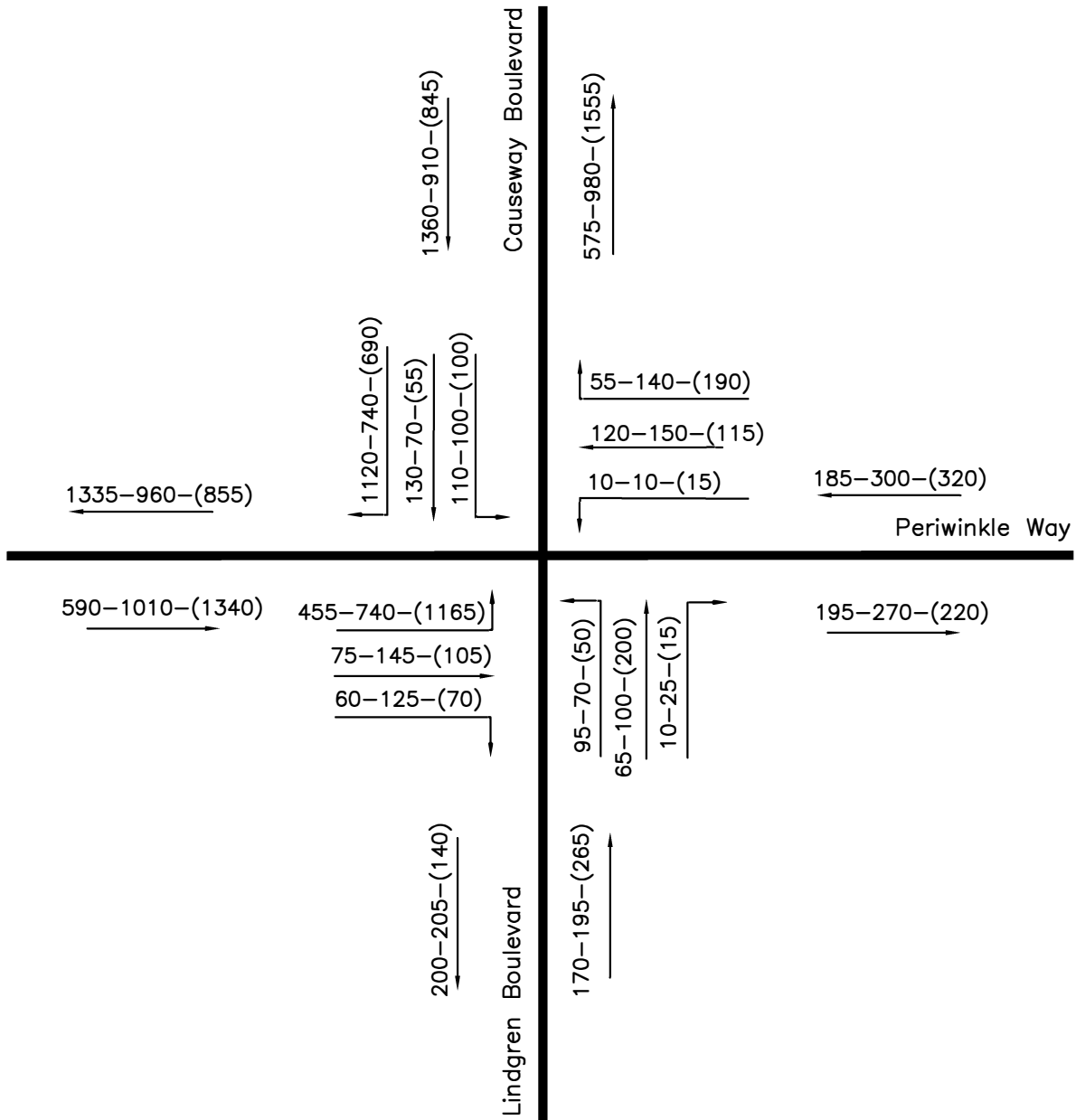


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/02B/0116

### 3. Periwinkle Way / Causeway Boulevard / Lindgren Boulevard



**LEGEND**

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

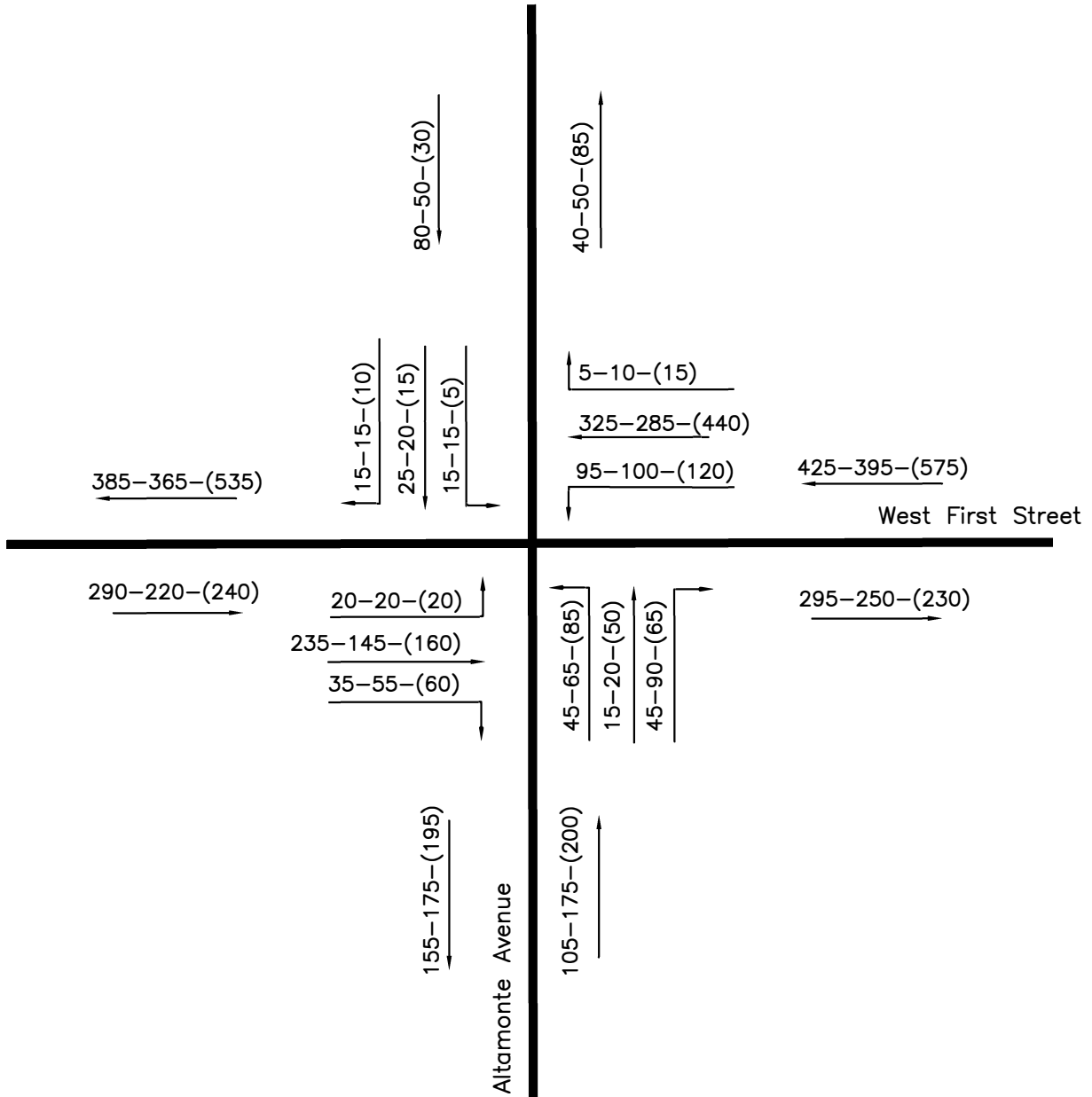


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/03B/0116

# 4. West First Street / Altamonte Avenue



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

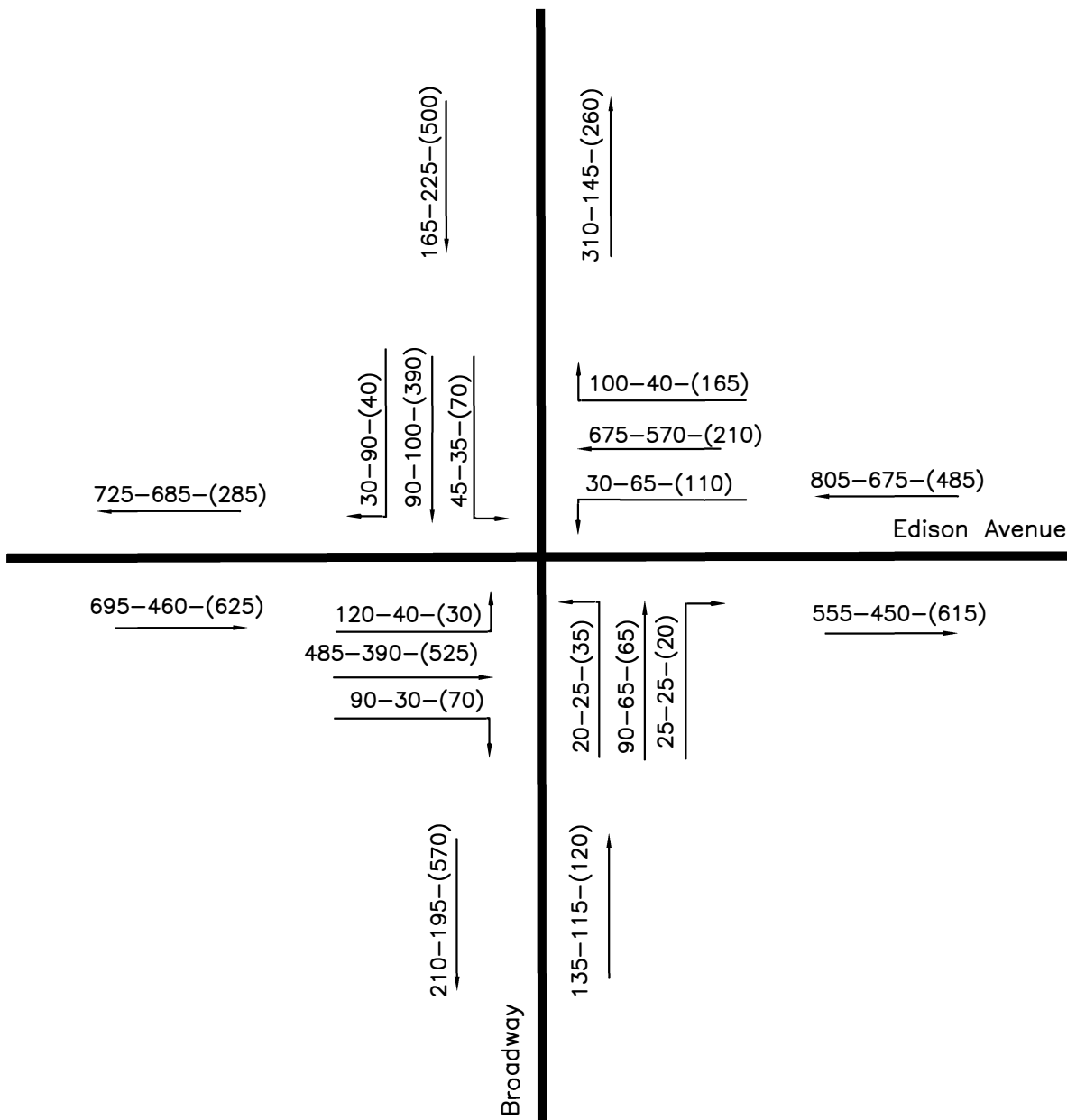


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/04B/0116

# 5. Edison Avenue / Broadway



LEGEND	
00	AM Peak
-00-	Mid-Day Peak
(00)	PM Peak

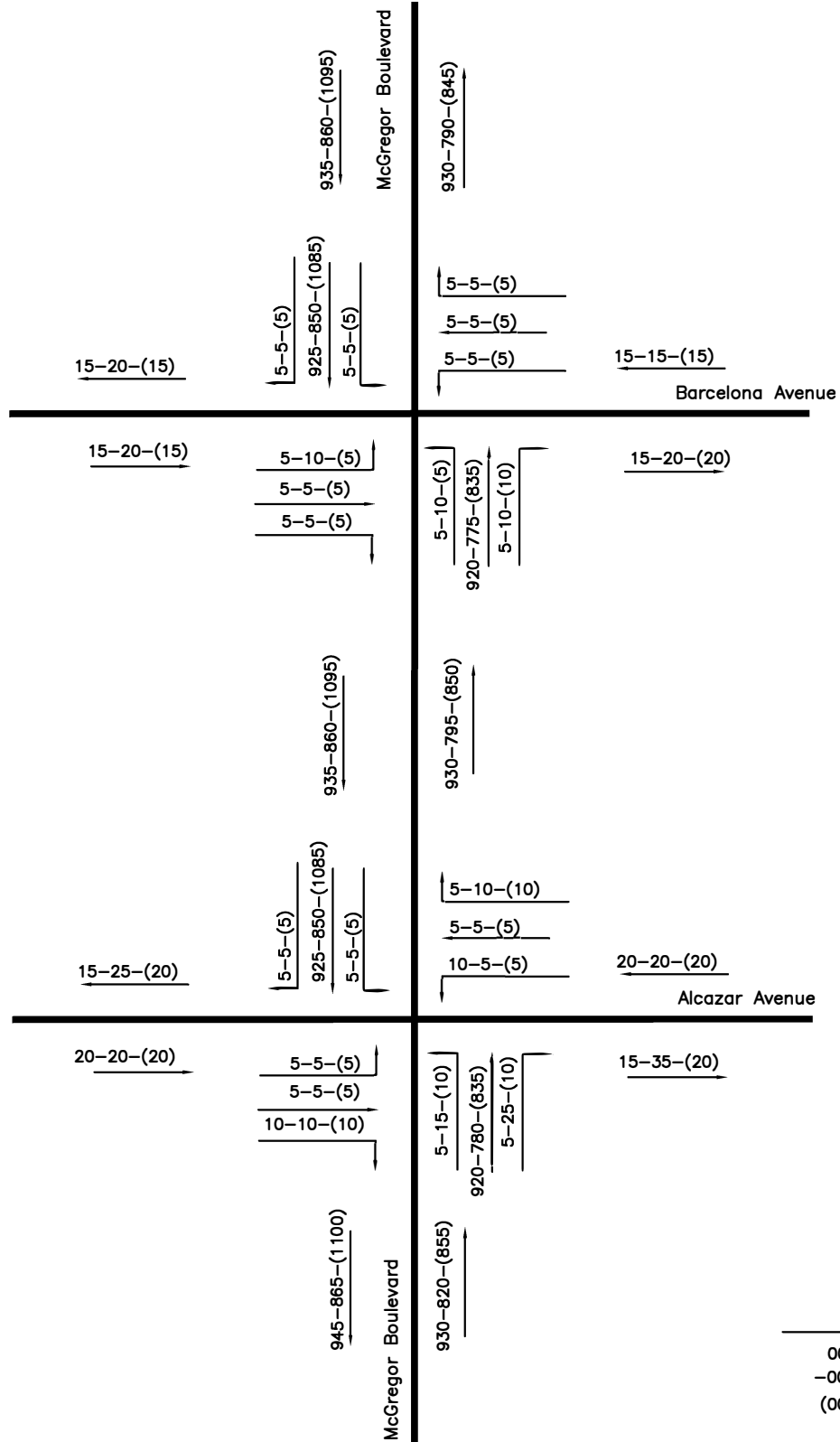


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/05B/0116

# 6. McGregor Boulevard / Barcelona Avenue / Alcazar Avenue



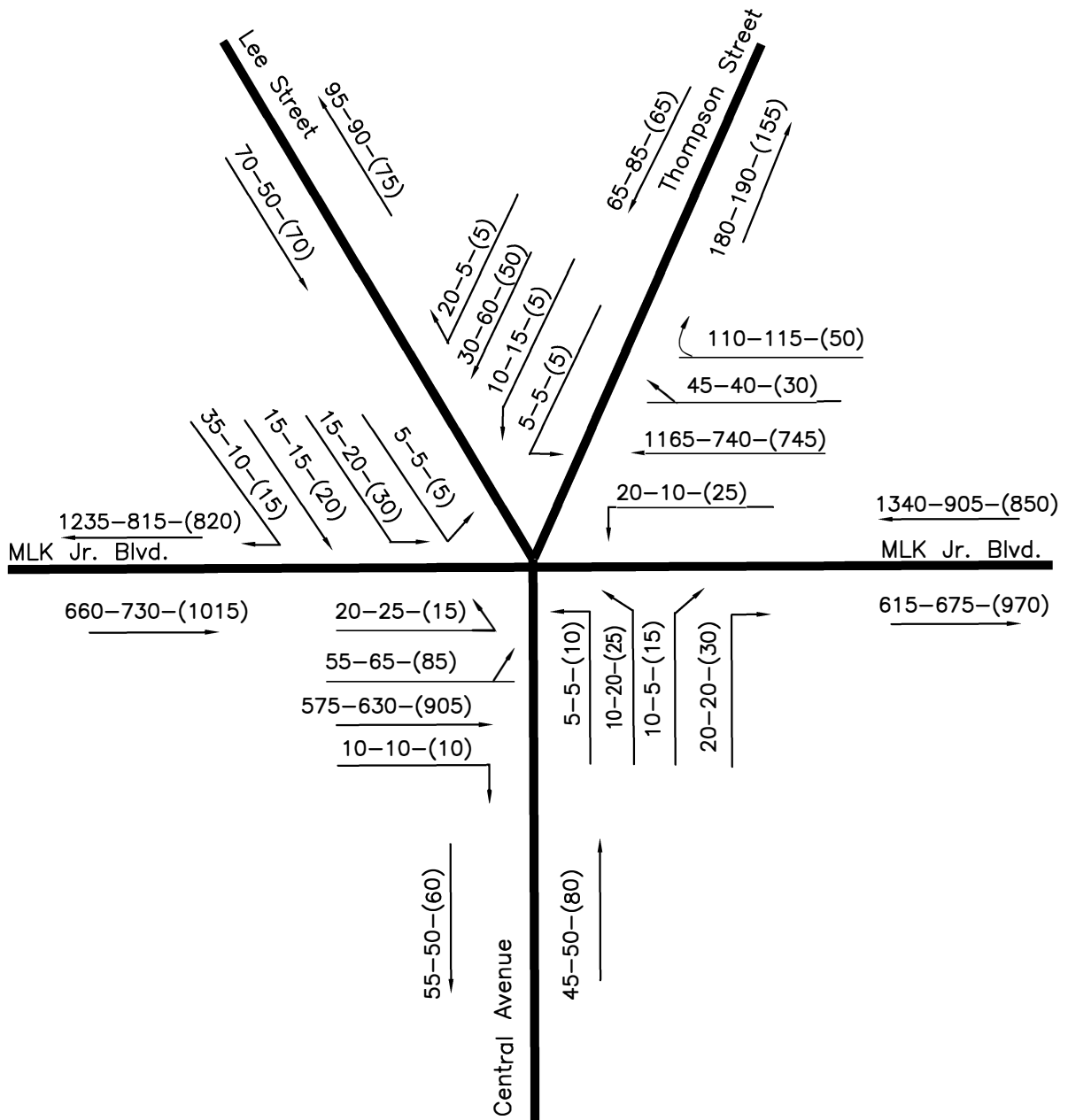
LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/06B/0116



# 7. MLK Jr. Boulevard/Lee Street/Central Avenue/Thompson Street



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

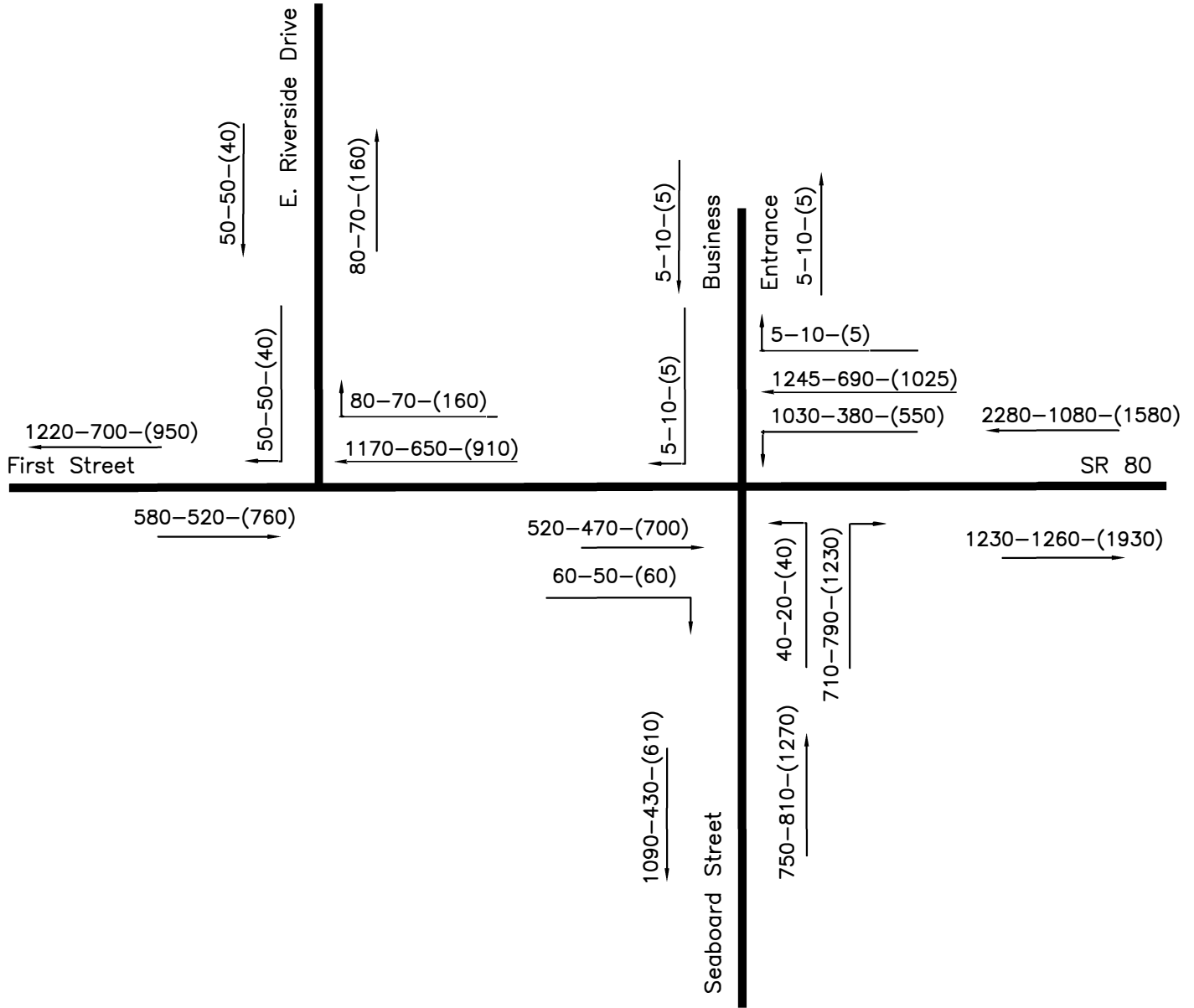


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/07B/0116

# 8. First Street / SR 80 / Seaboard Street



**LEGEND**

00	AM Peak
-00-	Mid-Day Peak
(00)	PM Peak

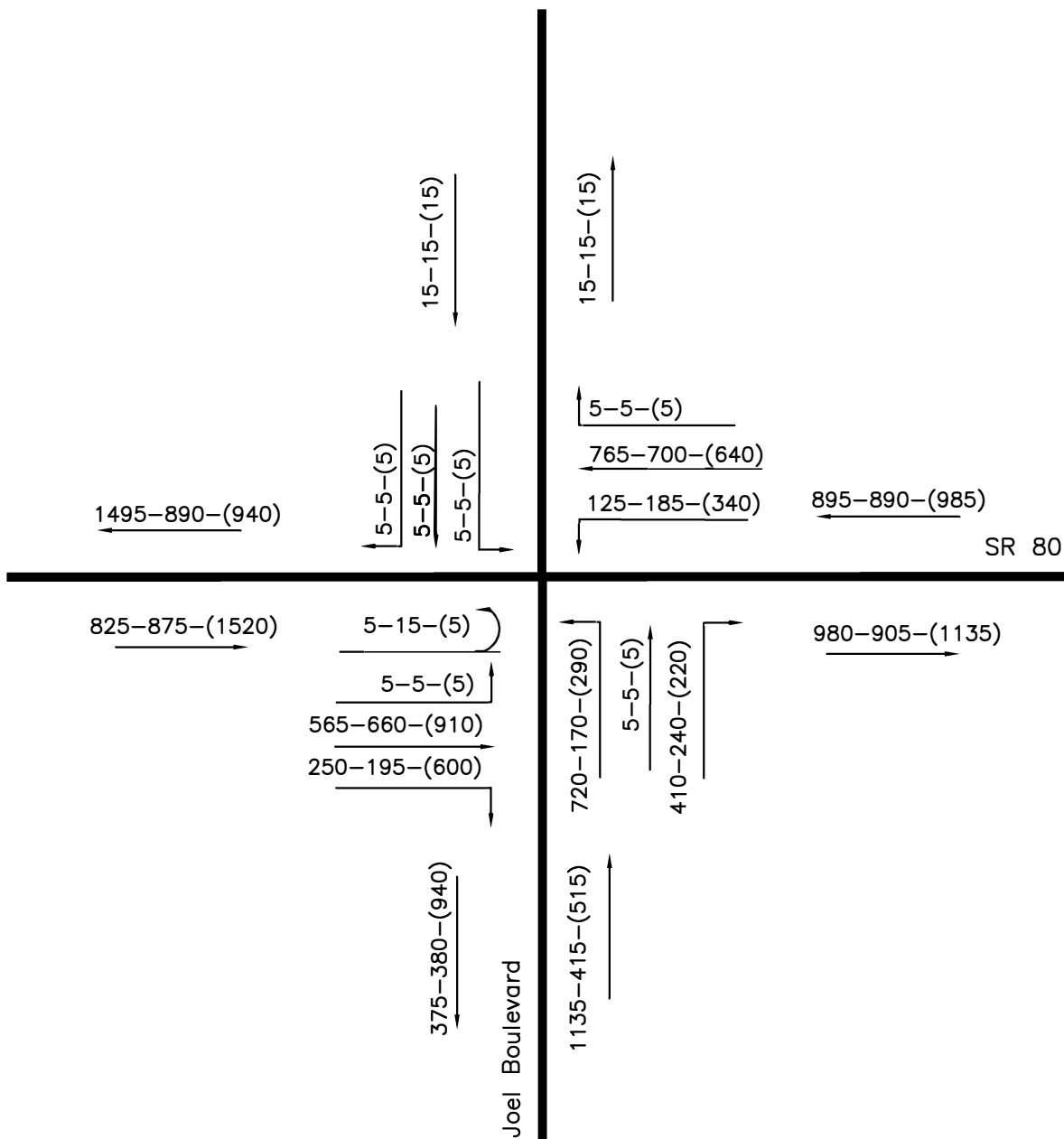


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/08B/0116

# 9. SR 80 / Joel Boulevard



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

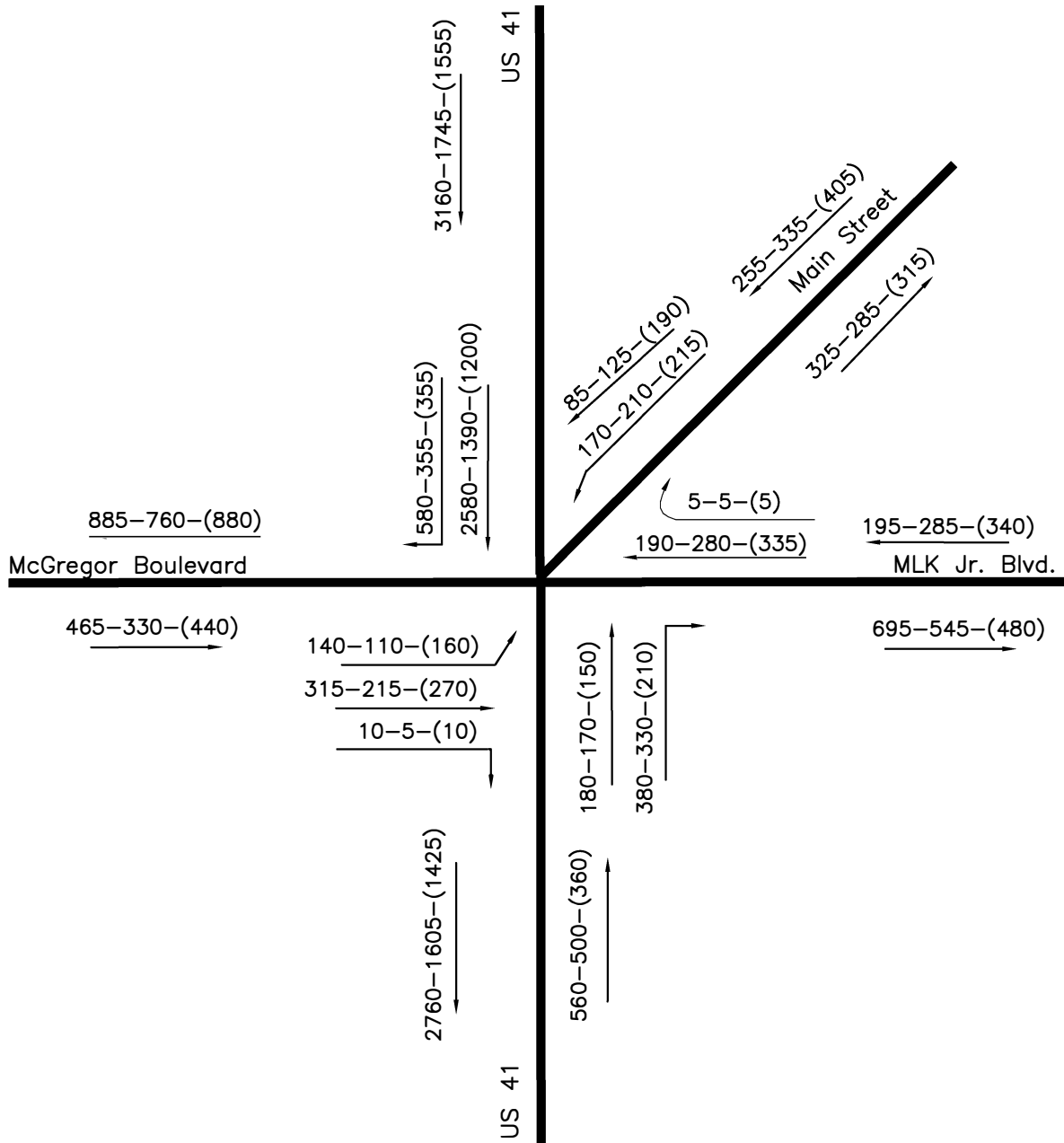


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/09B/0116

# 10. US 41/MLK Jr. Boulevard/McGregor Boulevard/Main Street



**LEGEND**

00	AM Peak
-00-	Mid-Day Peak
00)	PM Peak

(1) Forecasted volumes are based on traditional intersection under existing configurations. Conversion to a roundabout may result in additional movements and turn volumes.

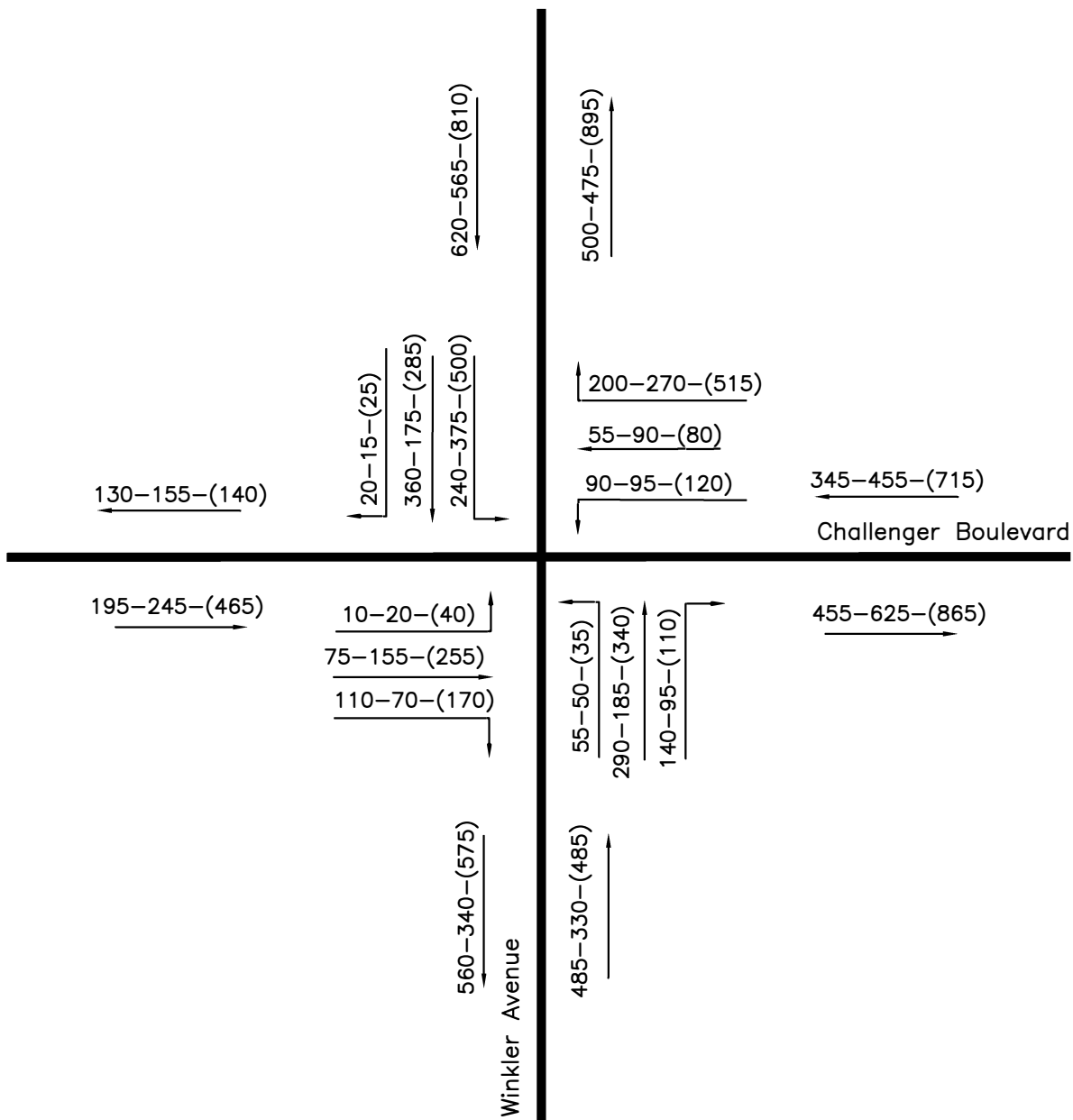


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/10B/0116

# 11. Winkler Avenue / Challenger Boulevard



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

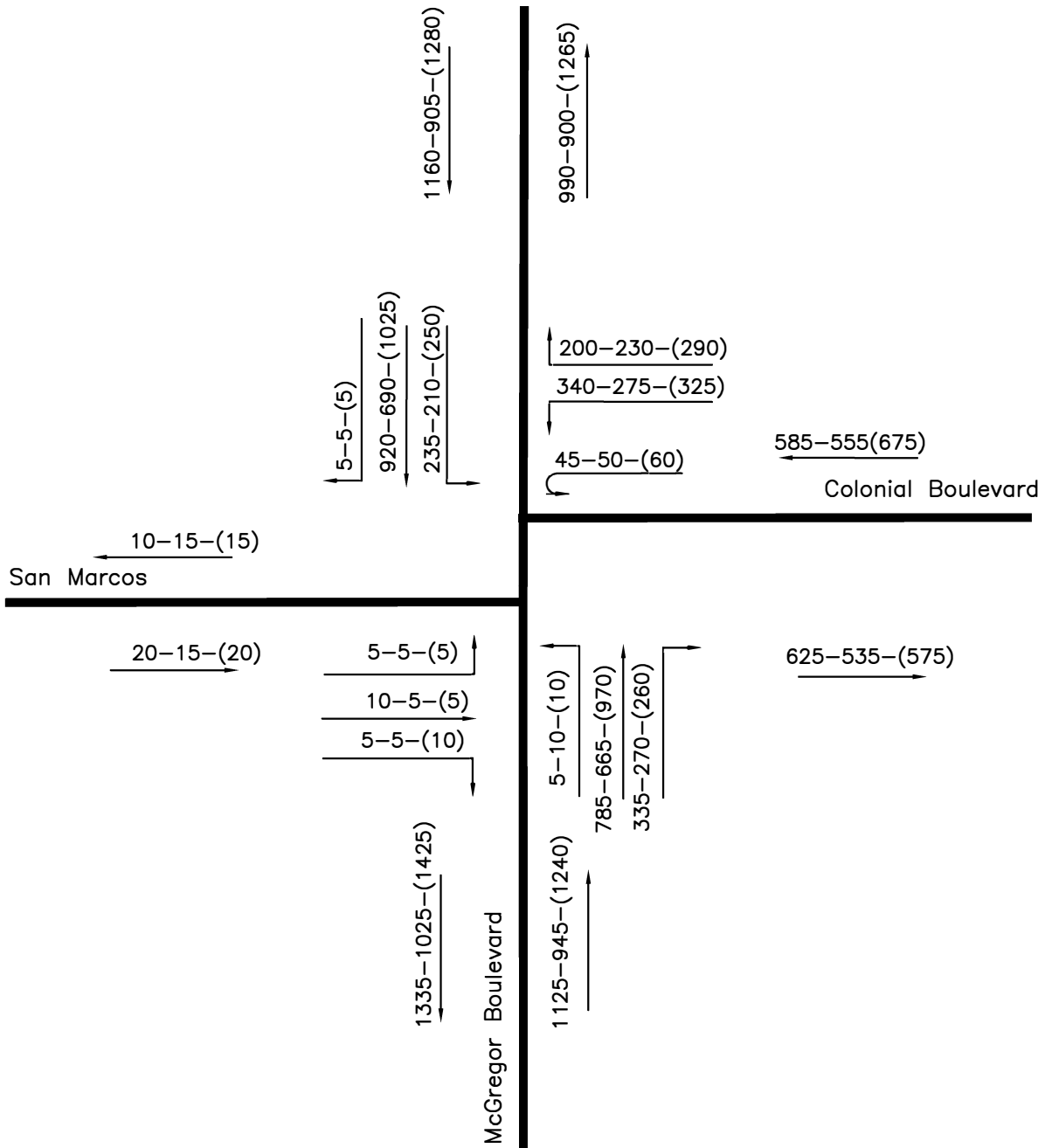


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/11A/1215

# 12. Colonial Boulevard / McGregor Boulevard



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

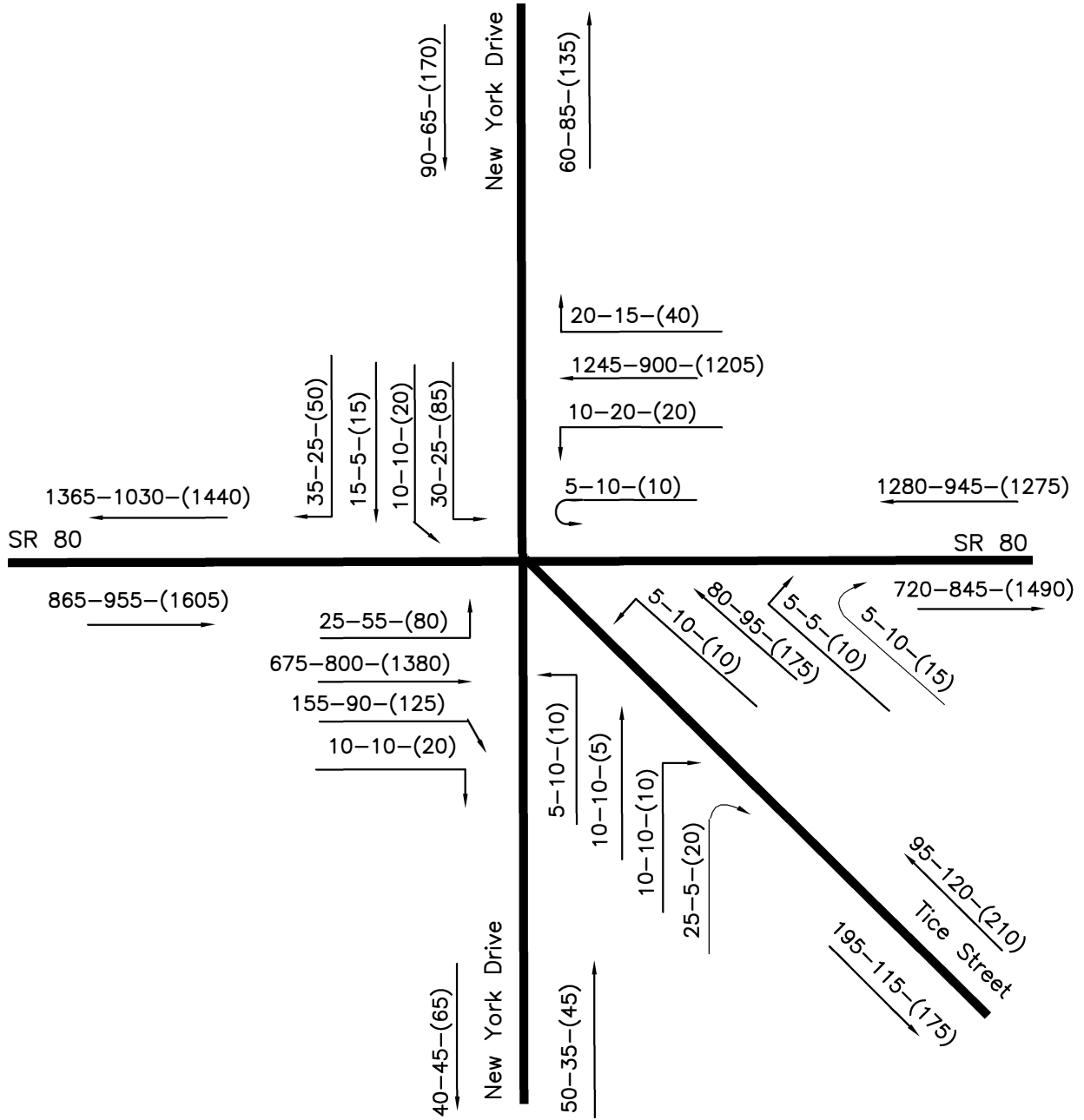


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/12C/0316

# 13. SR 80 / New York Drive / Tice Street



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

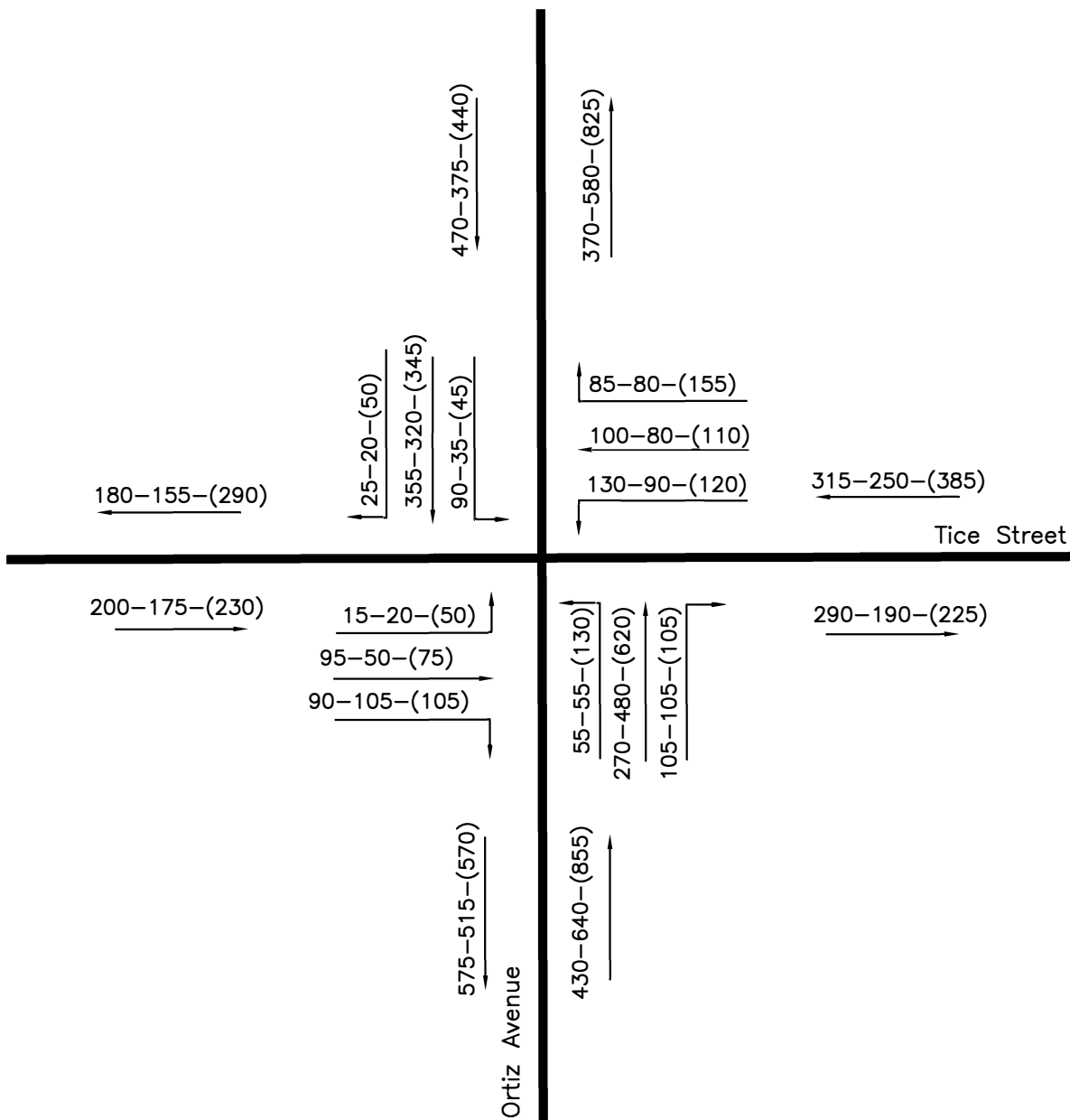


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/13B/0116

# 14. Ortiz Avenue / Tice Street



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak



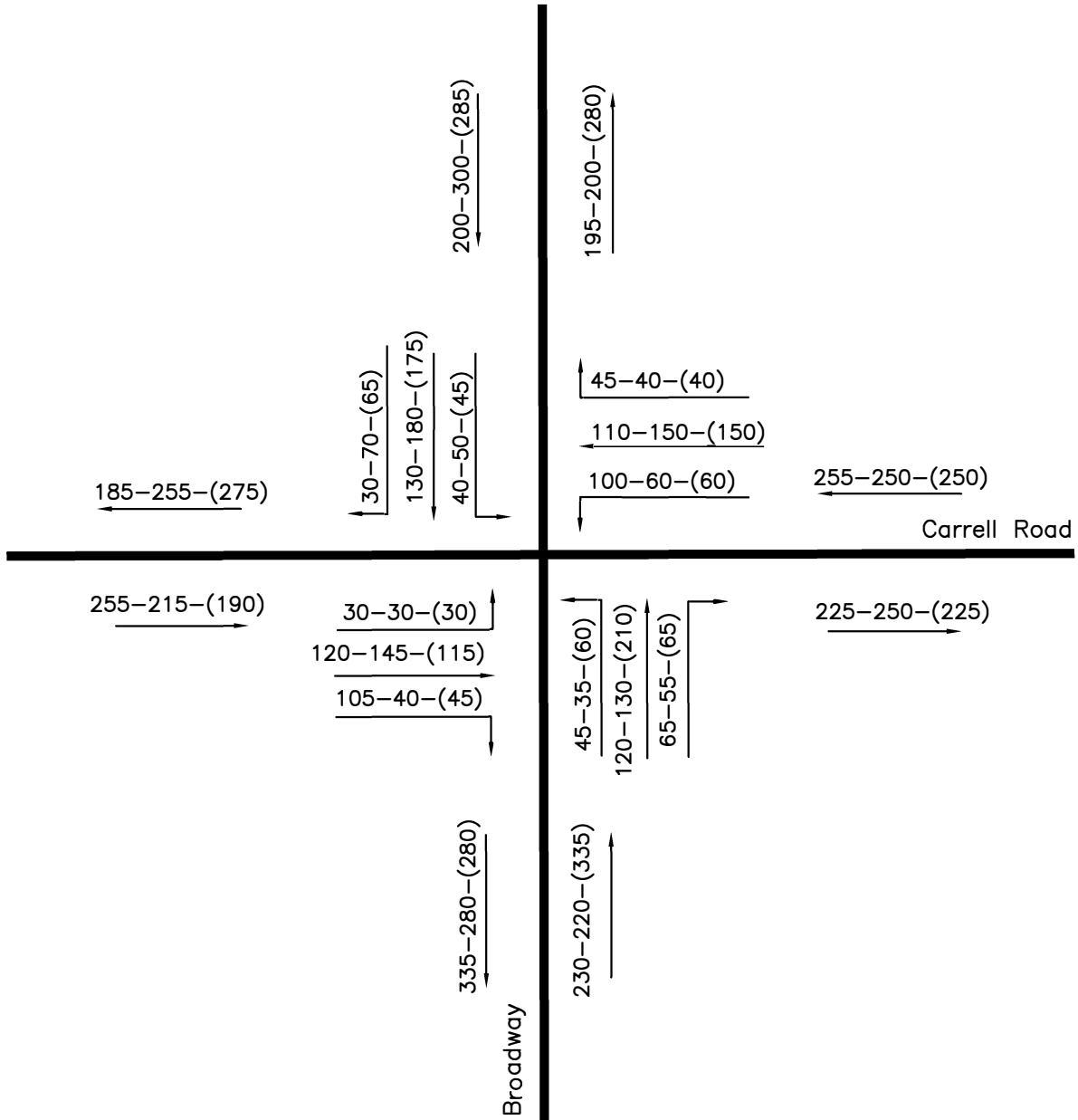
LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/14B/0116



# 15. Broadway / Carrell Road



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

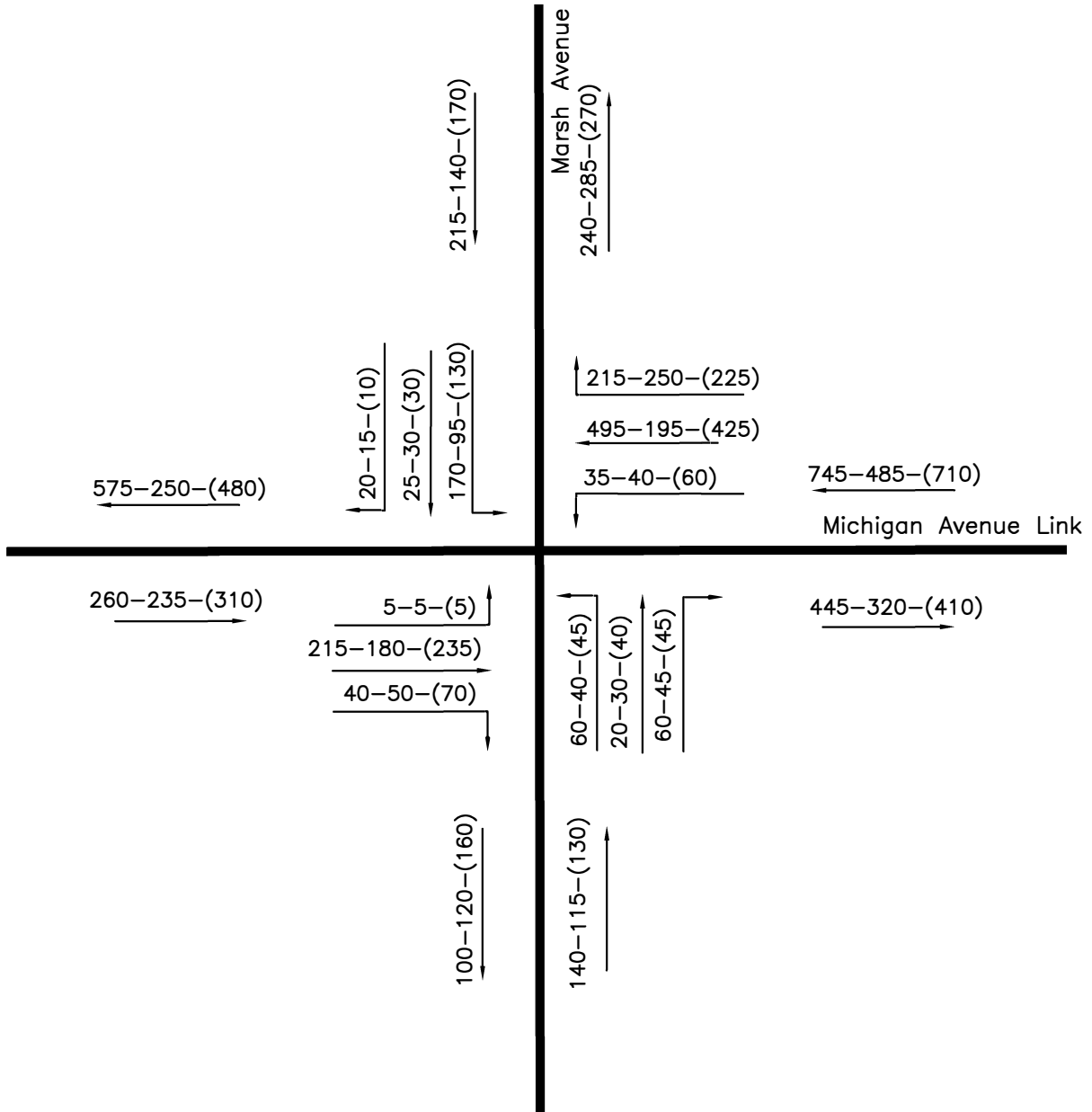


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/15B/0116

# 16. Michigan Avenue Link / Marsh Avenue



**LEGEND**

00	AM Peak
-00-	Mid-Day Peak
(00)	PM Peak

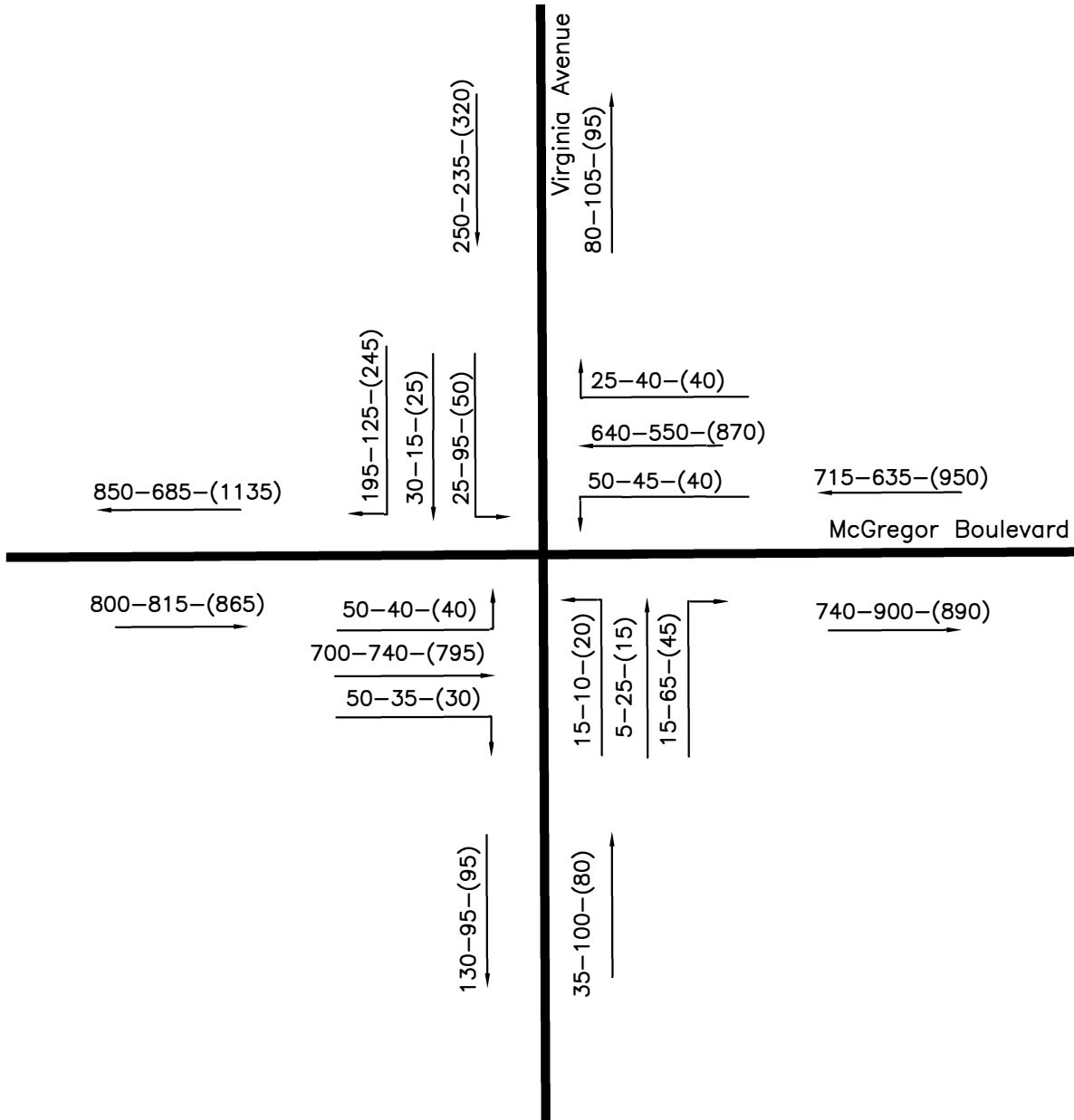


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/16B/0116

# 17. McGregor Boulevard / Virginia Avenue



### LEGEND

- 00 AM Peak
- 00- Mid-Day Peak
- (00) PM Peak

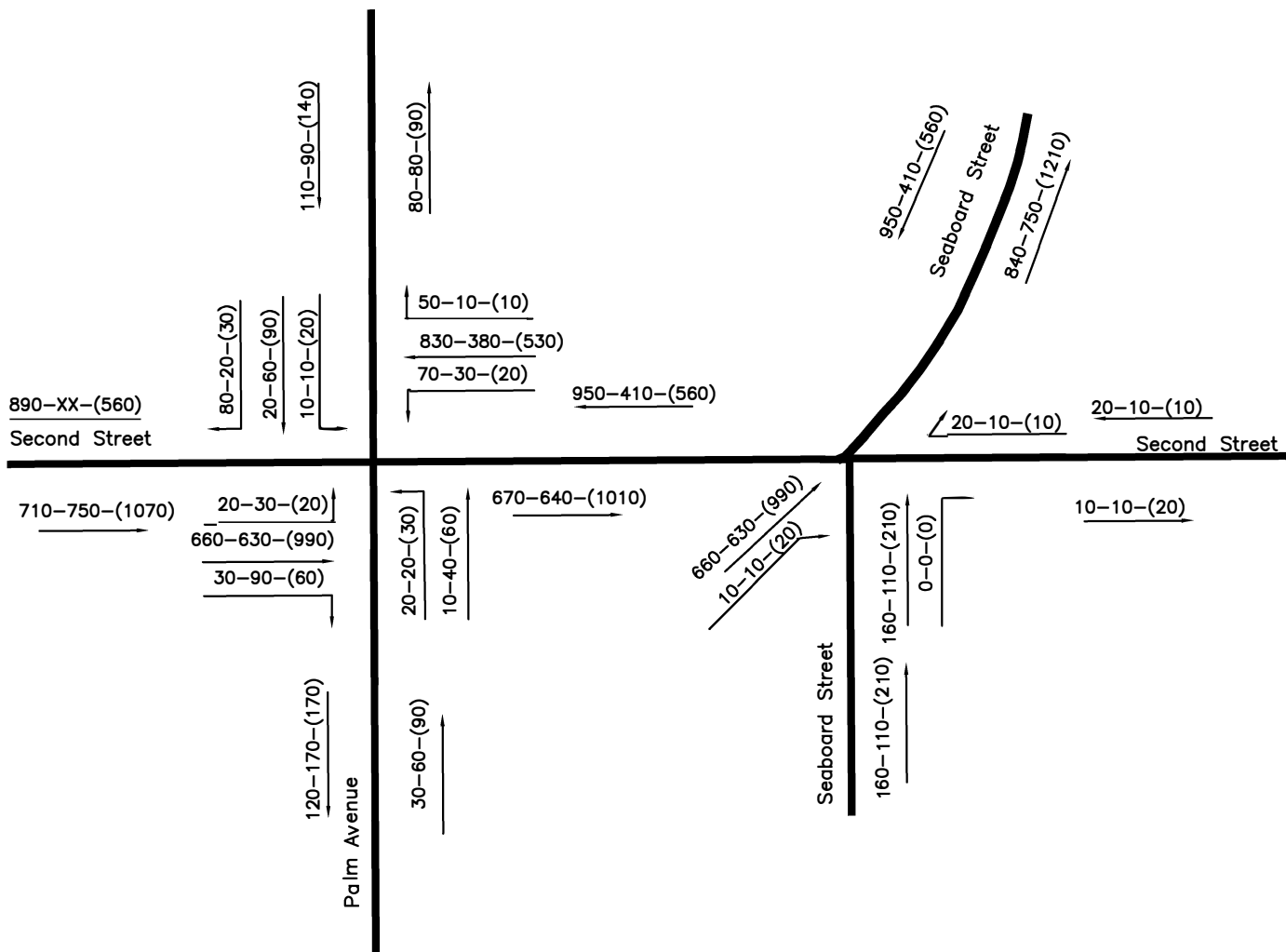


LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/17A/1215

# 18. Second Street / Palm Avenue



**LEGEND**

00	AM Peak
-00-	Mid-Day Peak
(00)	PM Peak



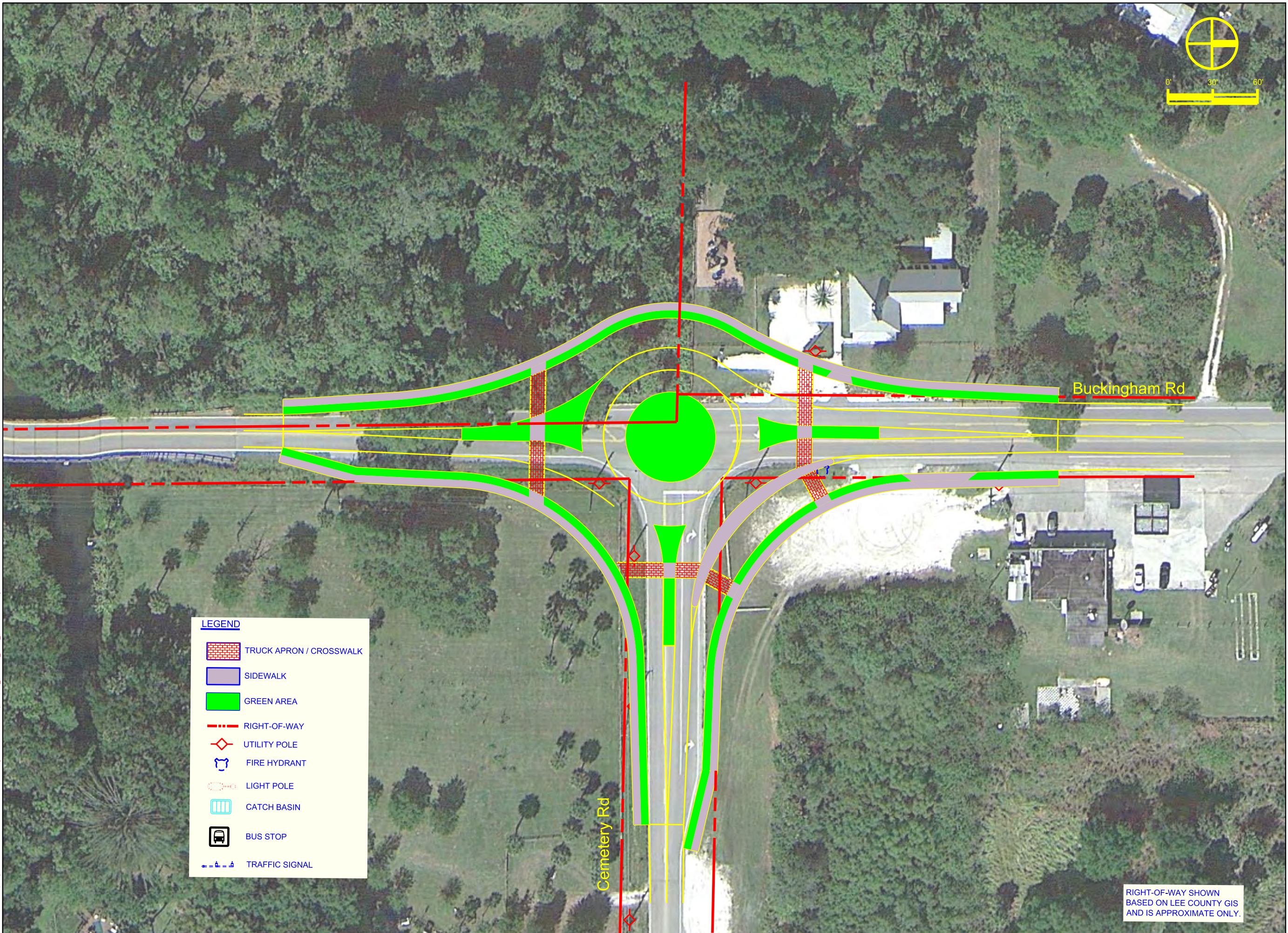
LEE COUNTY MPO  
ROUNDBOUT STUDY

FUTURE 2040  
PEAK HOUR, PEAK SEASON  
TURN VOLUMES

14504/18A/1215

**APPENDIX C**  
**ROUNDAABOUT CONCEPTUAL DESIGN PLANS**

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**LEGEND**

-  TRUCK APRON / CROSSWALK
-  SIDEWALK
-  GREEN AREA
-  RIGHT-OF-WAY
-  UTILITY POLE
-  FIRE HYDRANT
-  LIGHT POLE
-  CATCH BASIN
-  BUS STOP
-  TRAFFIC SIGNAL

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
AND IS APPROXIMATE ONLY.



**DAVID PLUMMER  
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Phone: (239)-332-2617

dpa@dplummer.com  
FLORIDA REGISTRATION NUMBER: 2690



**Alternate Street Design, PA.**  
1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



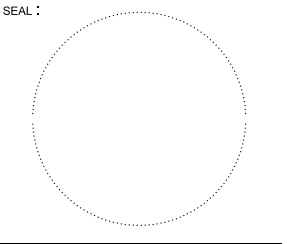
815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
www.leempo.com

PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

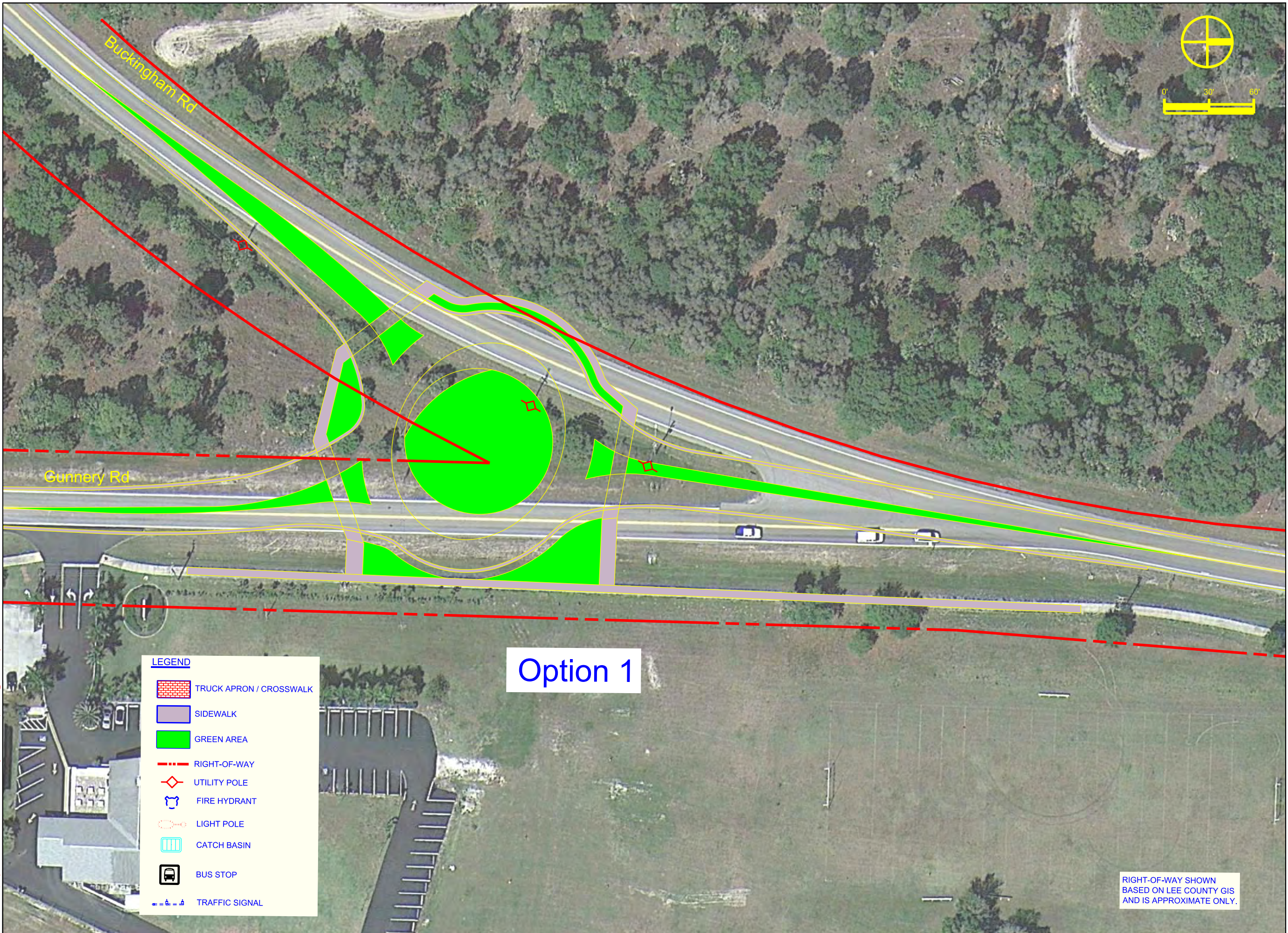
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DRAWING TITLE :  
**Roundabout Concept Plan  
Buckingham Rd &  
Cemetery Rd**

DRAWING NO :  
**1**

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**LEGEND**

	TRUCK APRON / CROSSWALK
	SIDEWALK
	GREEN AREA
	RIGHT-OF-WAY
	UTILITY POLE
	FIRE HYDRANT
	LIGHT POLE
	CATCH BASIN
	BUS STOP
	TRAFFIC SIGNAL

Option 1

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
AND IS APPROXIMATE ONLY.



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**Alternate Street Design, PA.**  
1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
www.leemppo.com

PROJECT NAME :

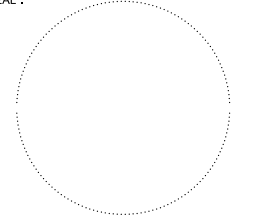
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

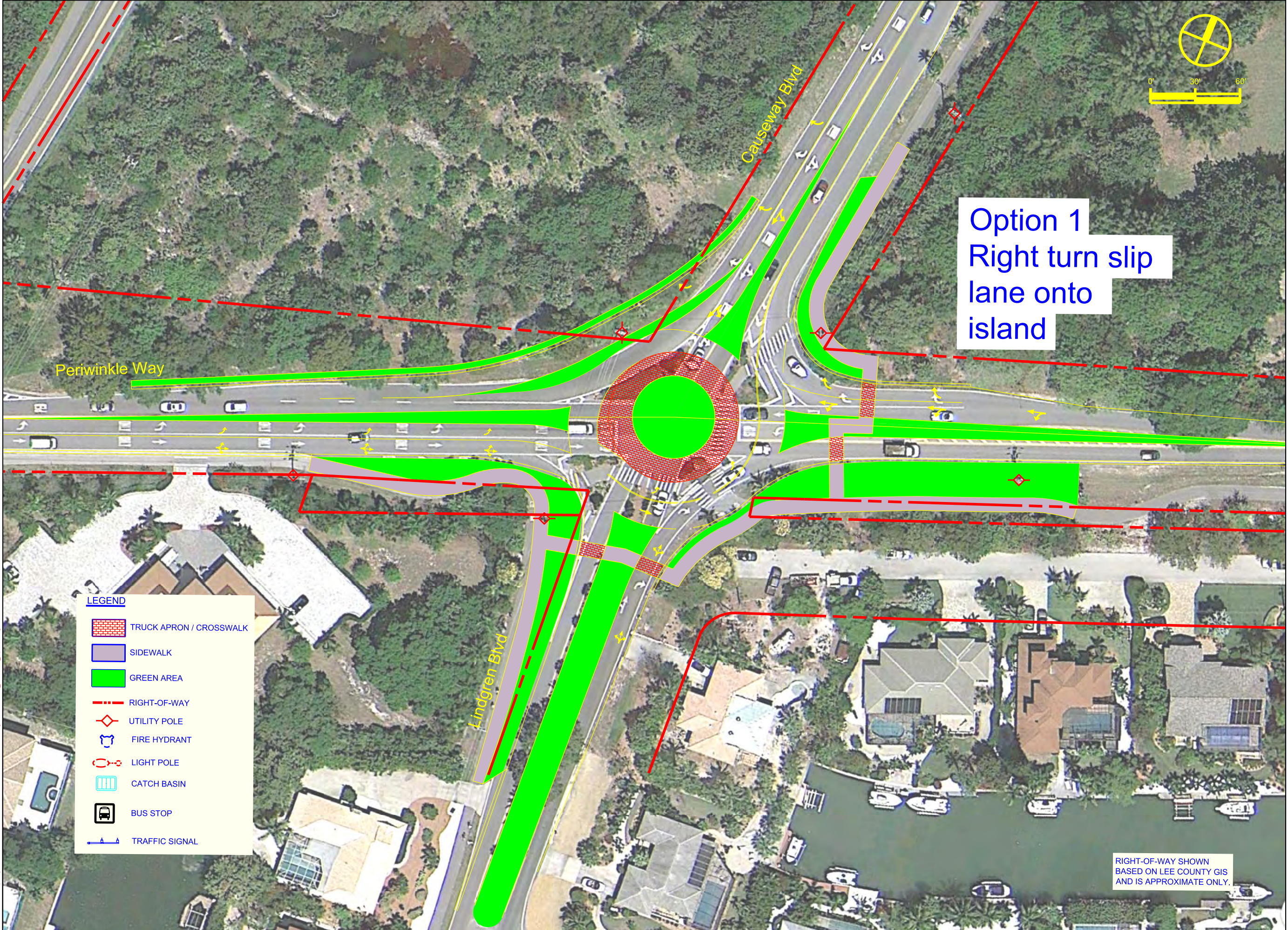
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**Roundabout Concept Plan  
Buckingham Road &  
Gunnery Road**

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Option 1  
Right turn slip  
lane onto  
island

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
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FLORIDA REGISTRATION NUMBER: 2690



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1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



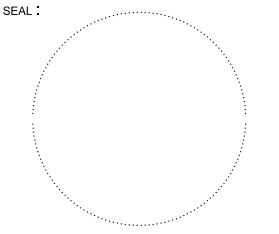
815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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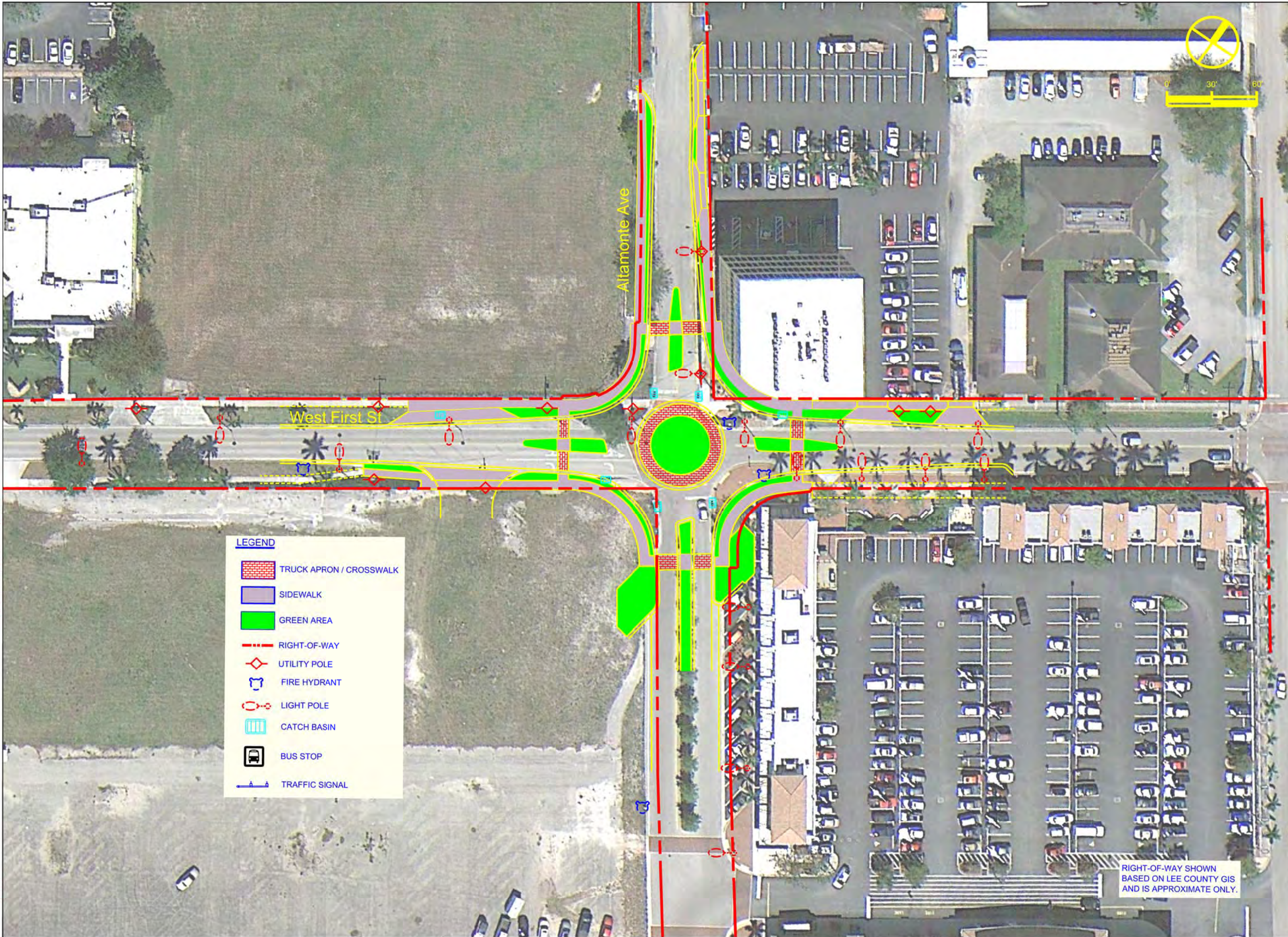


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**Roundabout Concept Plan  
Periwinkle Way &  
Lindgren Blvd**

DRAWING NO :  
**3**

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**LEGEND**

- TRUCK APRON / CROSSWALK
- SIDEWALK
- GREEN AREA
- RIGHT-OF-WAY
- UTILITY POLE
- FIRE HYDRANT
- LIGHT POLE
- CATCH BASIN
- BUS STOP
- TRAFFIC SIGNAL

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
AND IS APPROXIMATE ONLY.



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dpa@dplummer.com  
FLORIDA REGISTRATION NUMBER: 2690



**Alternate Street Design, P.A.**  
1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



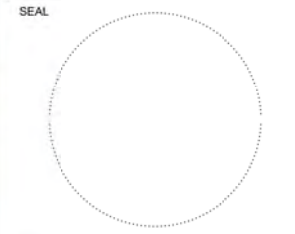
815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
www.leecompo.com

PROJECT NAME  
**Lee County MPO  
Roundabout Study**

JOB NUMBER #14504  
DATE 11/03/2015  
CAD FILE NO  
AGENCY NO

REVISIONS/SUBMISSIONS

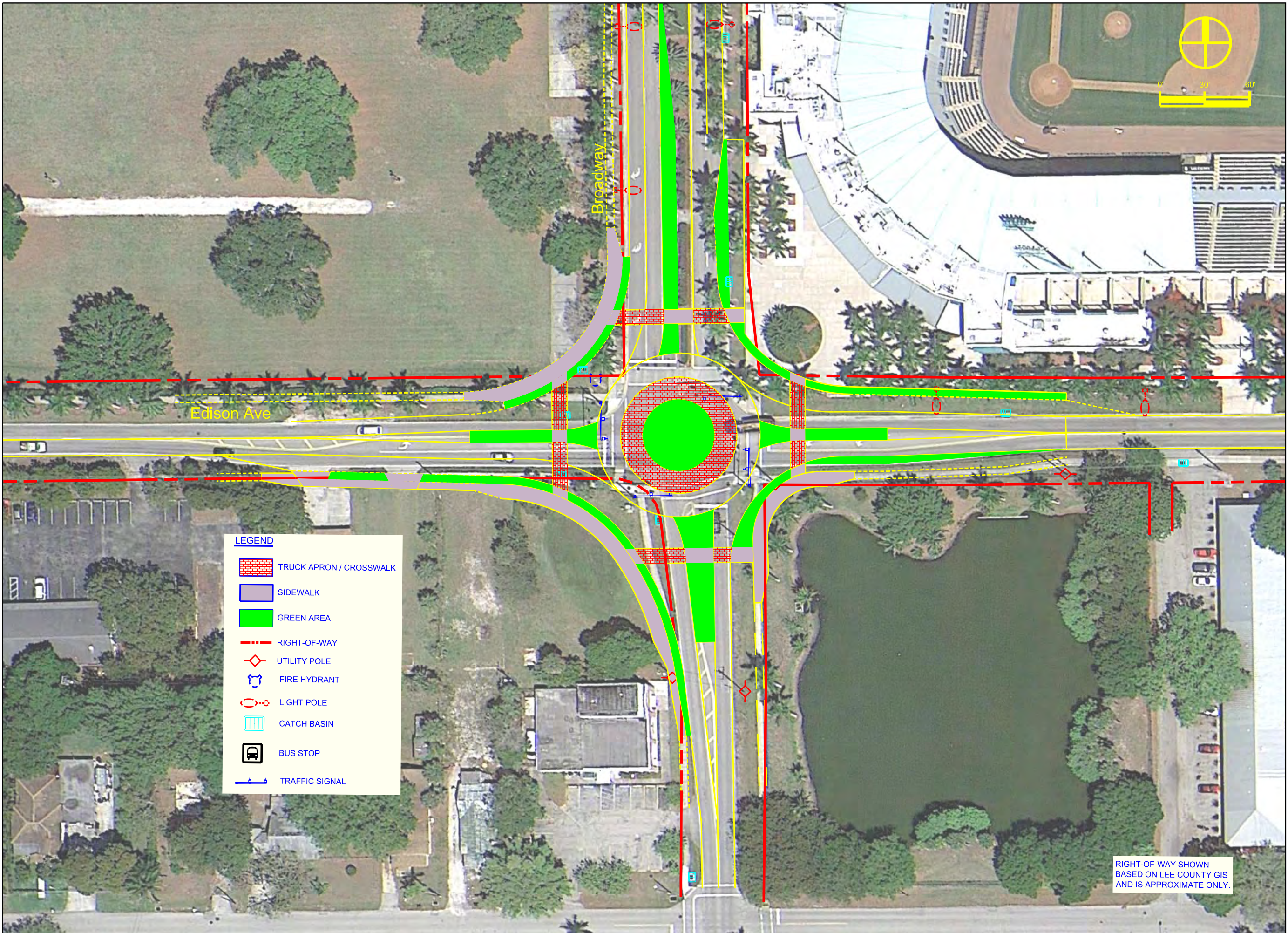
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DRAWING TITLE  
**Roundabout Concept Plan  
Altamonte Ave &  
West First St**

DRAWING NO

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RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
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FLORIDA REGISTRATION NUMBER: 2690



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1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



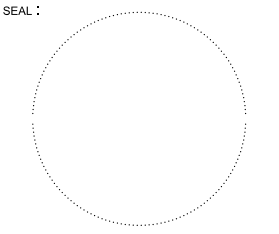
815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
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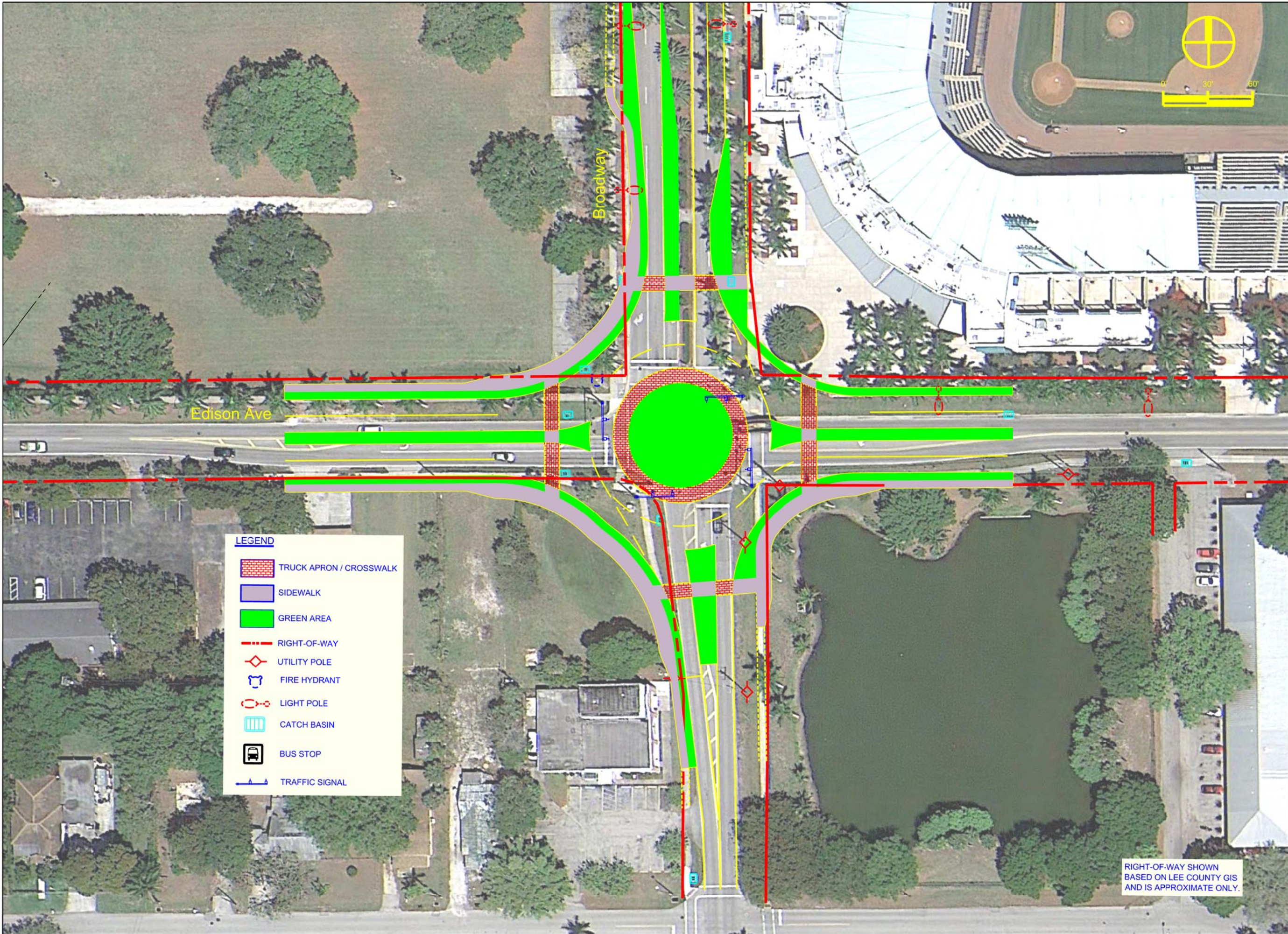
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**Roundabout Concept Plan  
Edison Ave &  
Broadway**

DRAWING NO :  
**5**



SFILES SDATES STIMES SUSEERS



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AND  
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dpa@dplummer.com  
FLORIDA REGISTRATION NUMBER: 2690



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1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



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Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :

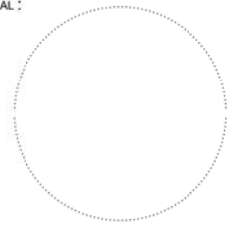
**Lee County MPO  
Roundabout Study**

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DATE : 11/03/2015  
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AGENCY NO :

REVISIONS/SUBMISSIONS :

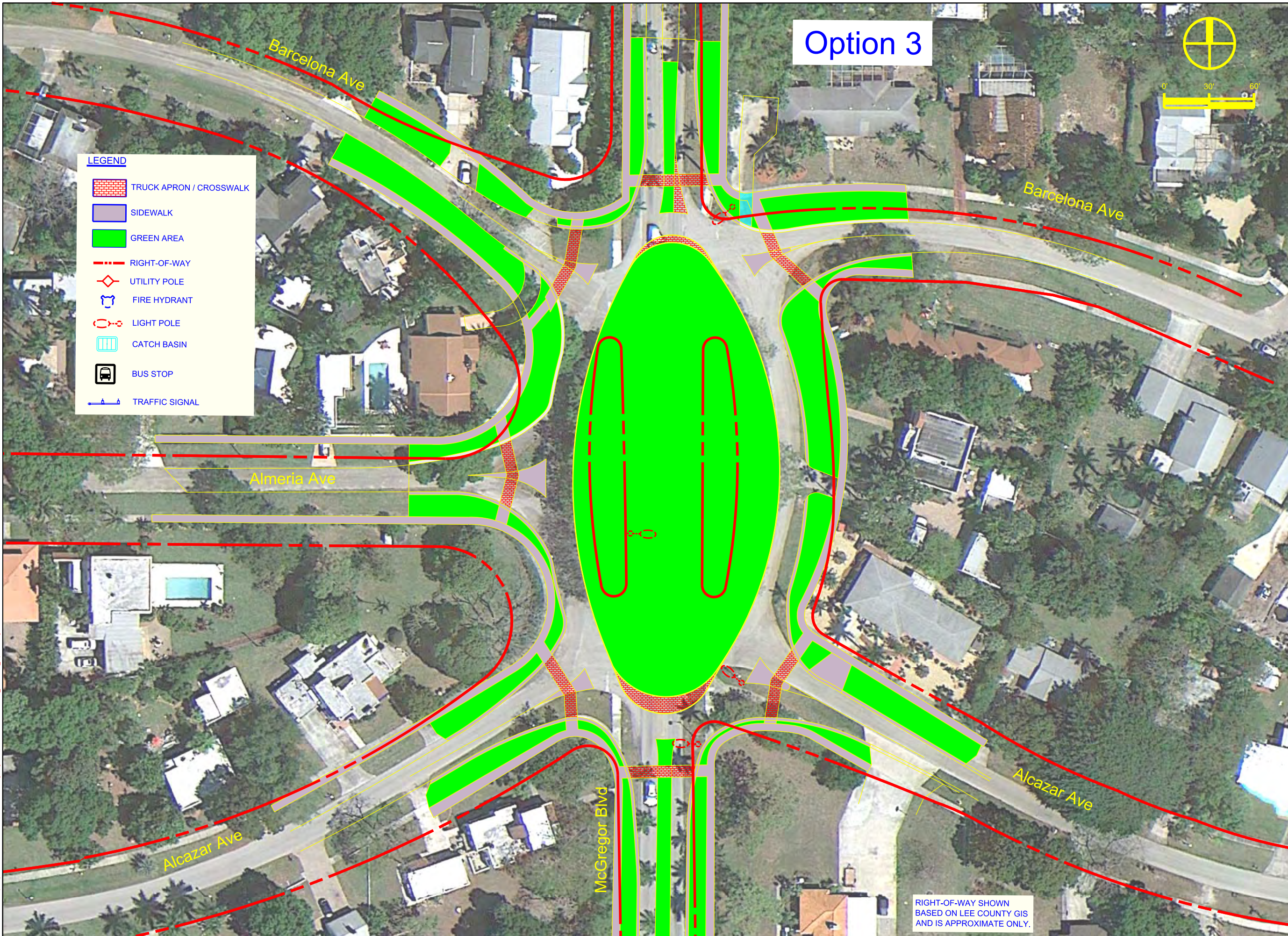
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SEAL :



DRAWING TITLE :  
**Roundabout Concept Plan  
Edison Ave &  
Broadway**

DRAWING NO :



**LEGEND**

	TRUCK APRON / CROSSWALK
	SIDEWALK
	GREEN AREA
	RIGHT-OF-WAY
	UTILITY POLE
	FIRE HYDRANT
	LIGHT POLE
	CATCH BASIN
	BUS STOP
	TRAFFIC SIGNAL

Option 3



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FLORIDA REGISTRATION NUMBER: 2690



**Alternate Street Design, PA.**  
1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



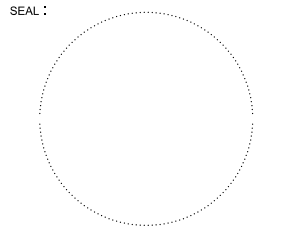
815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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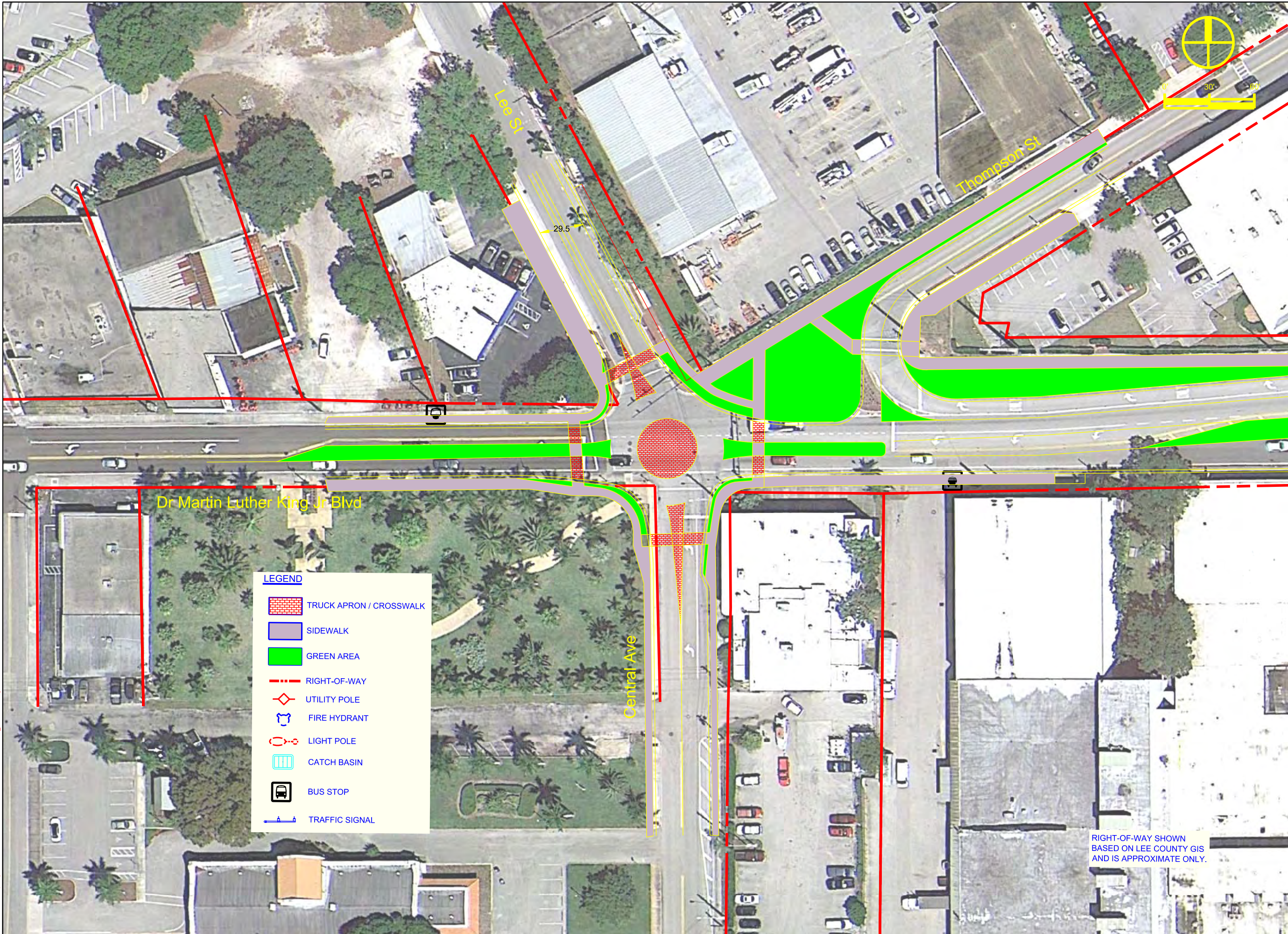


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**Roundabout Concept Plan  
McGregor Blvd &  
Barcelona Ave**

DRAWING NO :  
**6**

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
AND IS APPROXIMATE ONLY.

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1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



815 Nicholas Pkwy E.  
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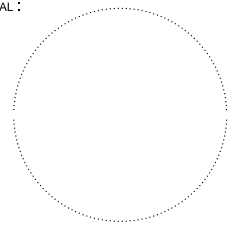
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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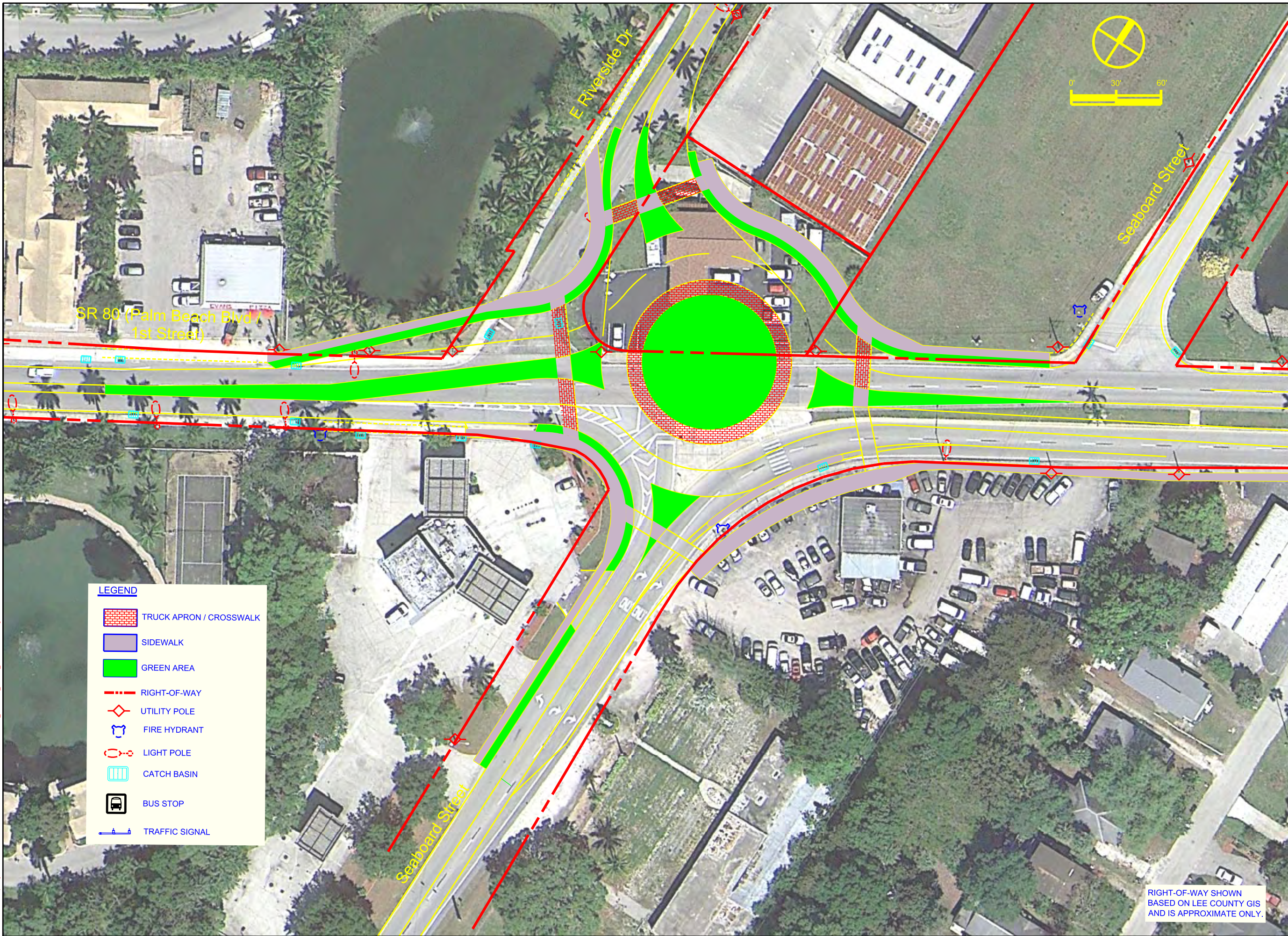
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**Roundabout Concept Plan  
M.L.K. Jr. Blvd &  
Lee St**

DRAWING NO :



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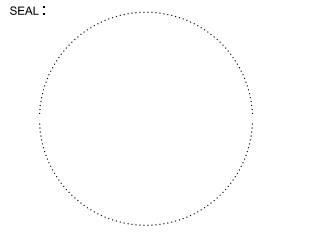
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**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

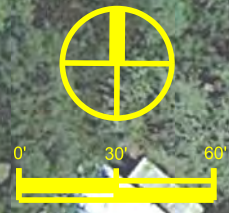
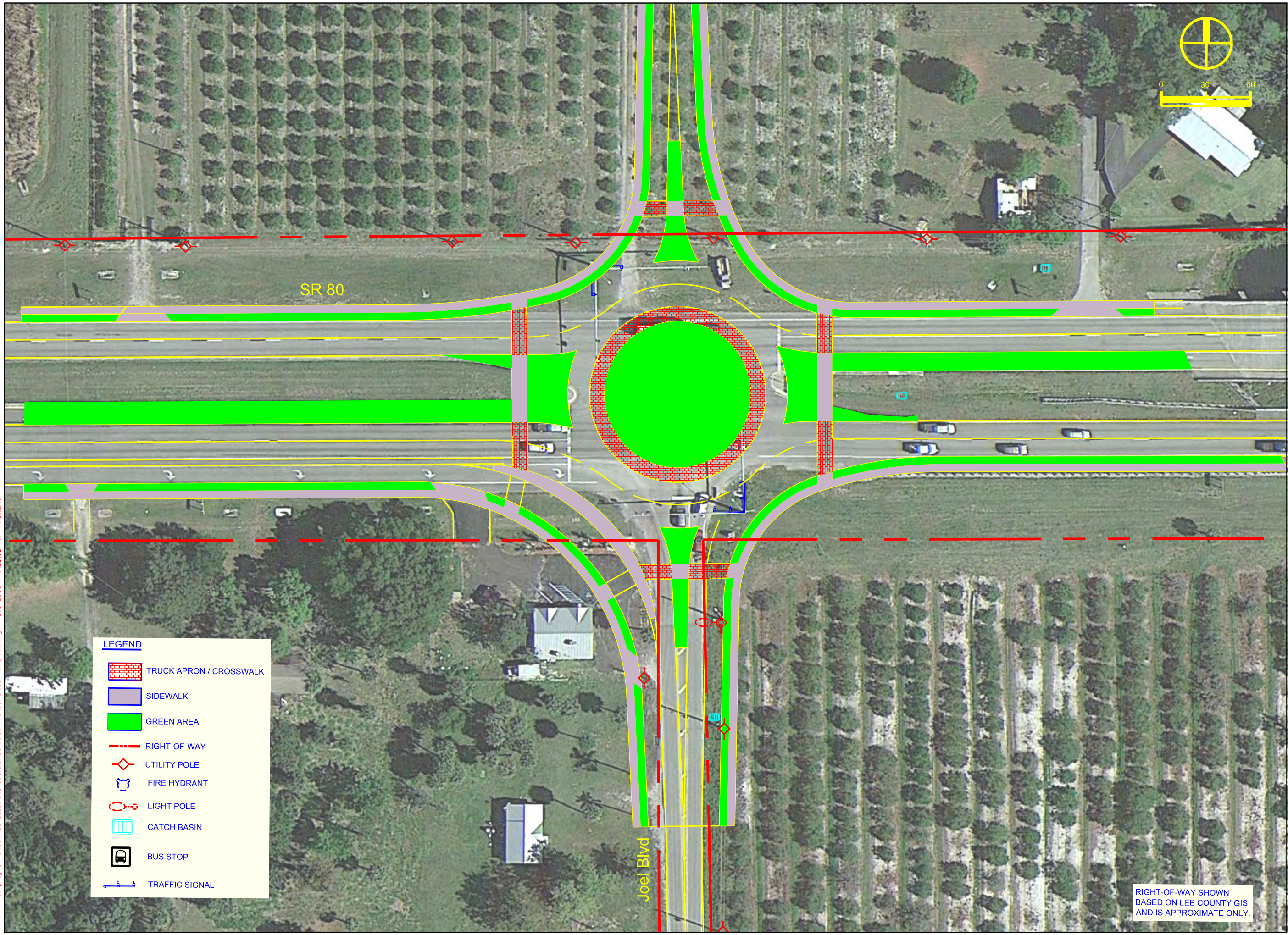
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SR 80 &  
Seaboard Street**

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mjwalwork@comcast.net



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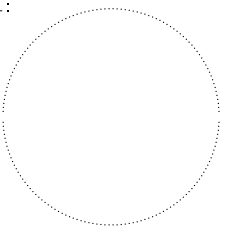
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
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CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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**Roundabout Concept Plan  
State Road 80 &  
Joel Blvd**

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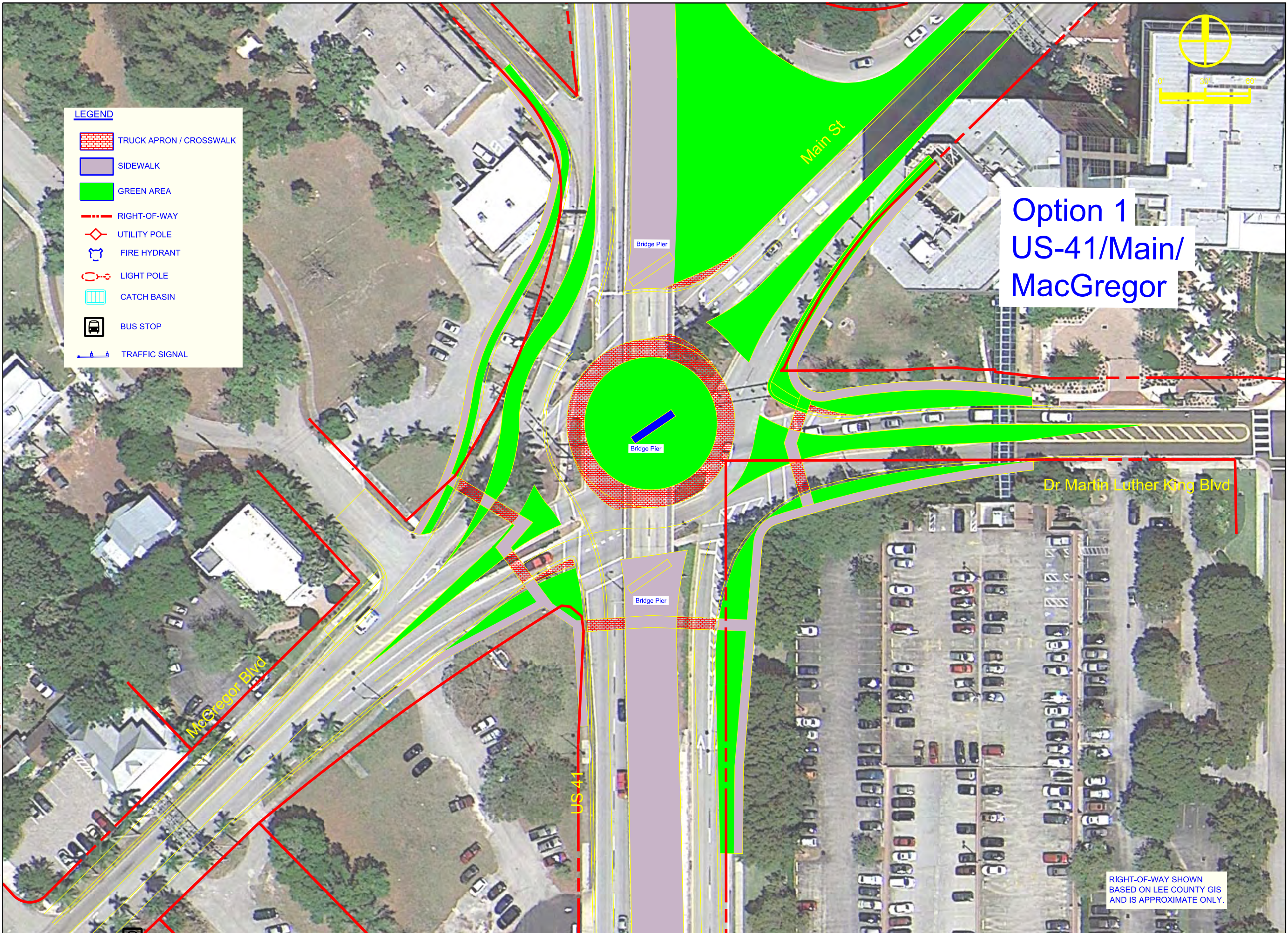
**9**

**LEGEND**

- TRUCK APRON / CROSSWALK
- SIDEWALK
- GREEN AREA
- RIGHT-OF-WAY
- UTILITY POLE
- FIRE HYDRANT
- LIGHT POLE
- CATCH BASIN
- BUS STOP
- TRAFFIC SIGNAL

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
AND IS APPROXIMATE ONLY.

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**LEGEND**

	TRUCK APRON / CROSSWALK
	SIDEWALK
	GREEN AREA
	RIGHT-OF-WAY
	UTILITY POLE
	FIRE HYDRANT
	LIGHT POLE
	CATCH BASIN
	BUS STOP
	TRAFFIC SIGNAL



**Option 1  
US-41/Main/  
MacGregor**



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mjwallwork@comcast.net



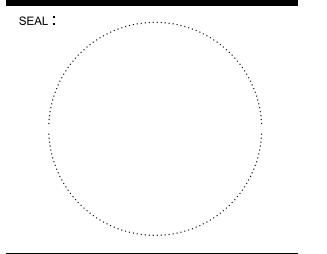
815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

REVISIONS/SUBMISSIONS :

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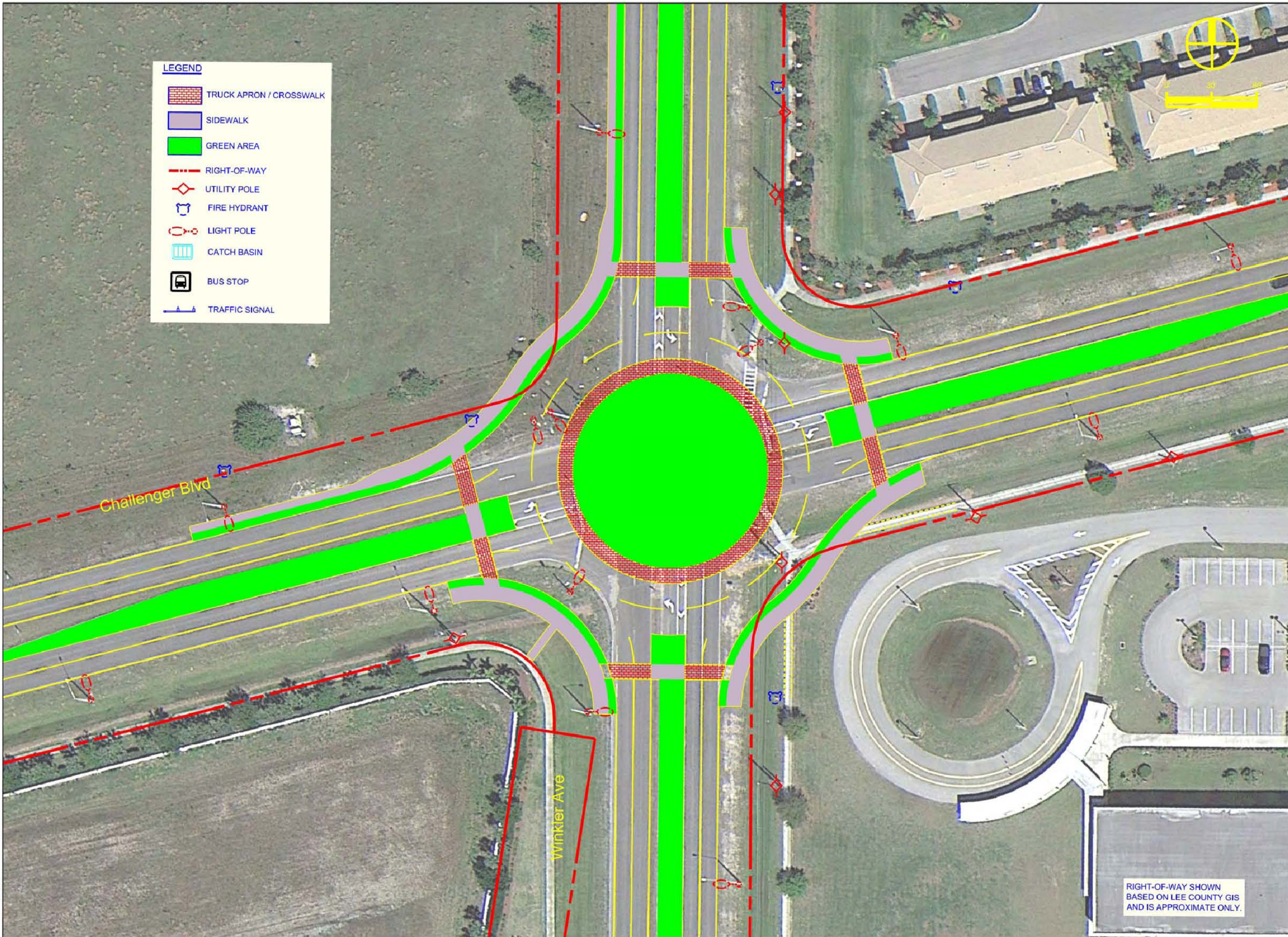


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**Roundabout Concept Plan  
US 41 / M.L.K. Jr Blvd &  
Main St / McGregor**

DRAWING NO :  
**10**

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
AND IS APPROXIMATE ONLY.





**LEGEND**

-  TRUCK APRON / CROSSWALK
-  SIDEWALK
-  GREEN AREA
-  RIGHT-OF-WAY
-  UTILITY POLE
-  FIRE HYDRANT
-  LIGHT POLE
-  CATCH BASIN
-  BUS STOP
-  TRAFFIC SIGNAL



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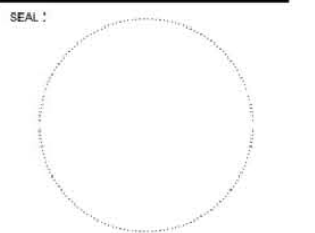
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**Lee County MPO  
Roundabout Study**

JOB NUMBER : 814504  
DATE : 11/03/2015  
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AGENCY NO :

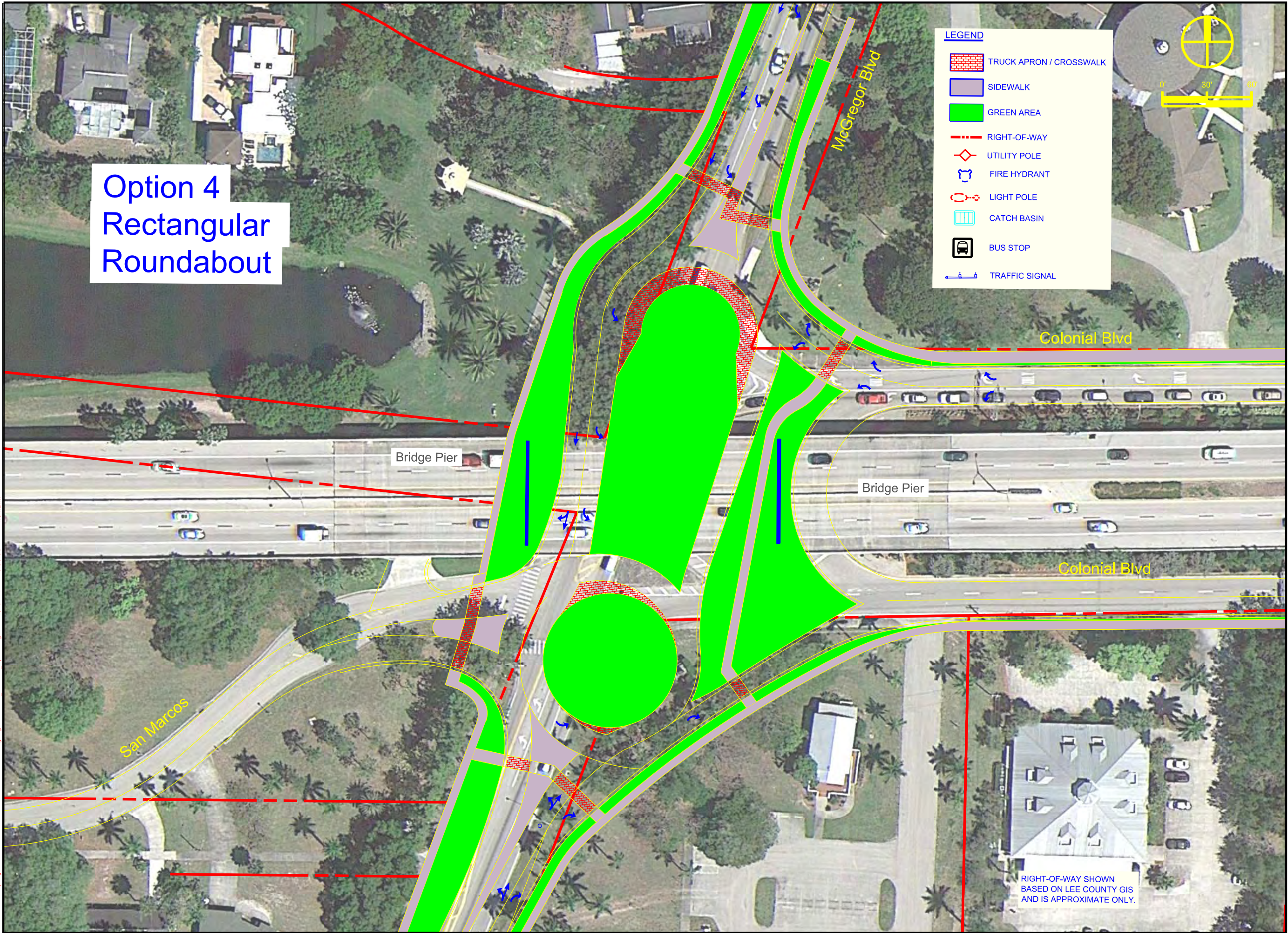
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DRAWING TITLE :  
**Roundabout Concept Plan  
Winkler Ave Ext &  
Challenger Blvd**

DRAWING NO :



**Option 4  
Rectangular  
Roundabout**

**LEGEND**

-  TRUCK APRON / CROSSWALK
-  SIDEWALK
-  GREEN AREA
-  RIGHT-OF-WAY
-  UTILITY POLE
-  FIRE HYDRANT
-  LIGHT POLE
-  CATCH BASIN
-  BUS STOP
-  TRAFFIC SIGNAL



RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
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mjwallwork@comcast.net



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PROJECT NAME :

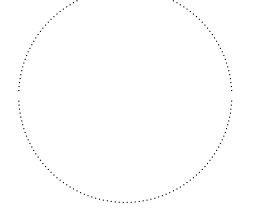
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
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REVISIONS/SUBMISSIONS :

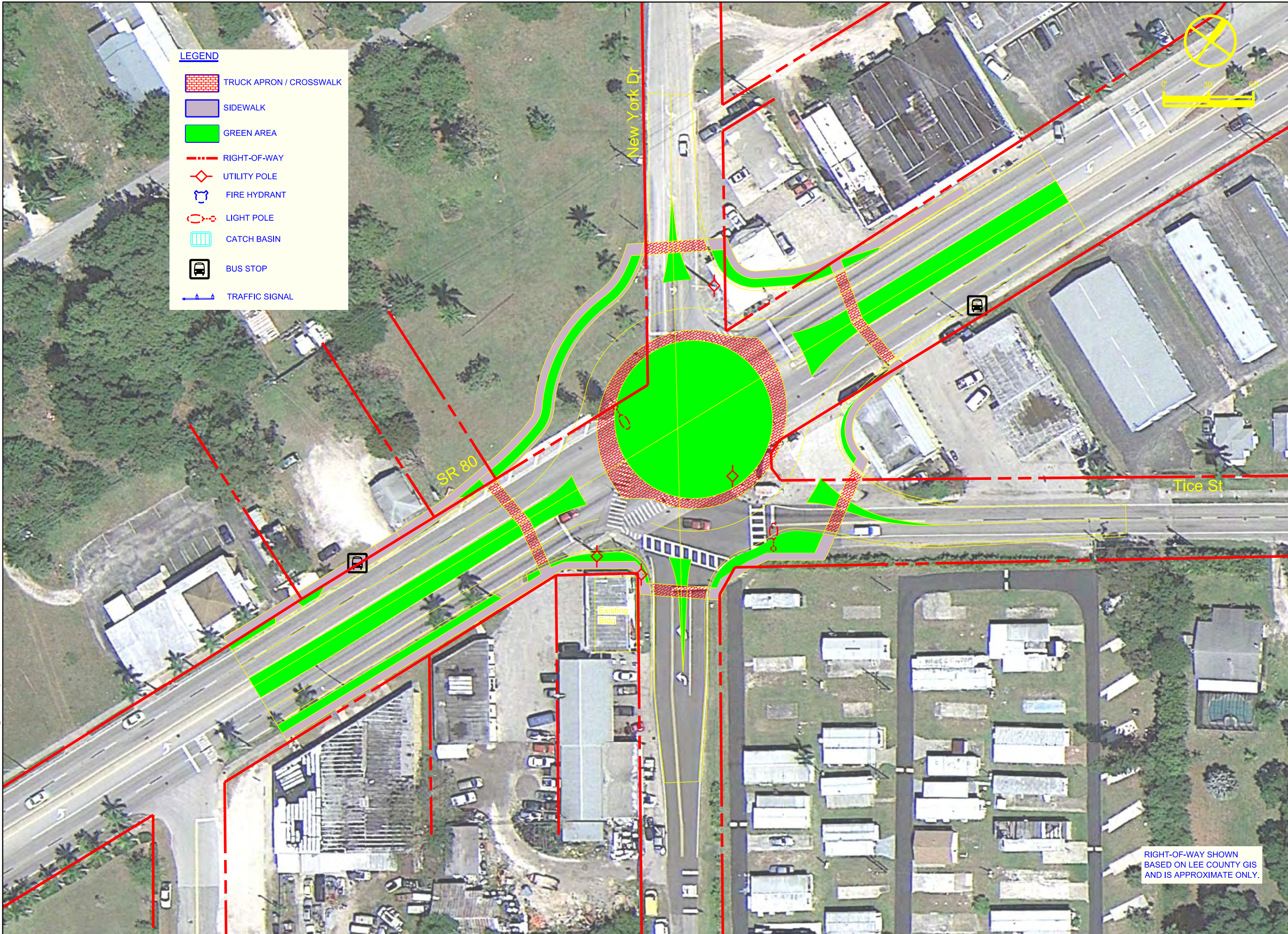
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DRAWING TITLE :  
**Roundabout Concept Plan  
Colonial Blvd &  
McGregor Blvd**

DRAWING NO :



**LEGEND**

	TRUCK APRON / CROSSWALK
	SIDEWALK
	GREEN AREA
	RIGHT-OF-WAY
	UTILITY POLE
	FIRE HYDRANT
	LIGHT POLE
	CATCH BASIN
	BUS STOP
	TRAFFIC SIGNAL



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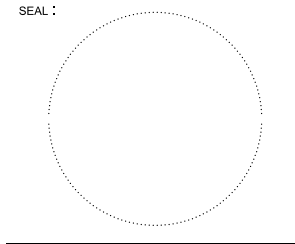
815 Nicholas Pkwy E.  
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PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
CAD FILE NO :  
AGENCY NO :

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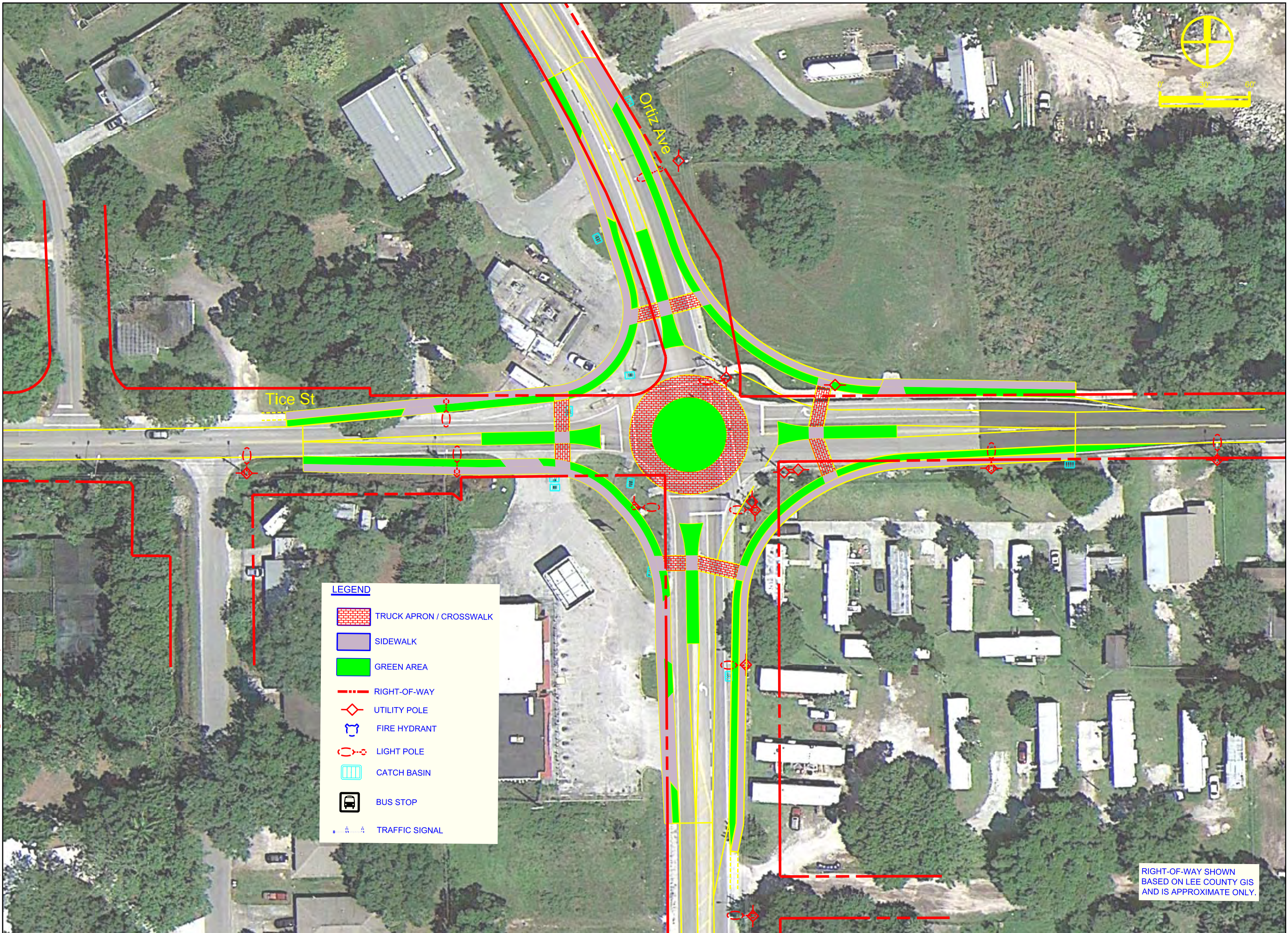
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State Road 80 &  
New York Dr / Tice St**

DRAWING NO :  
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RIGHT-OF-WAY SHOWN  
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**LEGEND**

- TRUCK APRON / CROSSWALK
- SIDEWALK
- GREEN AREA
- RIGHT-OF-WAY
- UTILITY POLE
- FIRE HYDRANT
- LIGHT POLE
- CATCH BASIN
- BUS STOP
- TRAFFIC SIGNAL

RIGHT-OF-WAY SHOWN  
BASED ON LEE COUNTY GIS  
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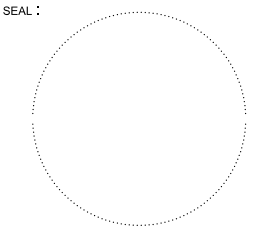
815 Nicholas Pkwy E.  
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Roundabout Study**

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DATE : 11/03/2015  
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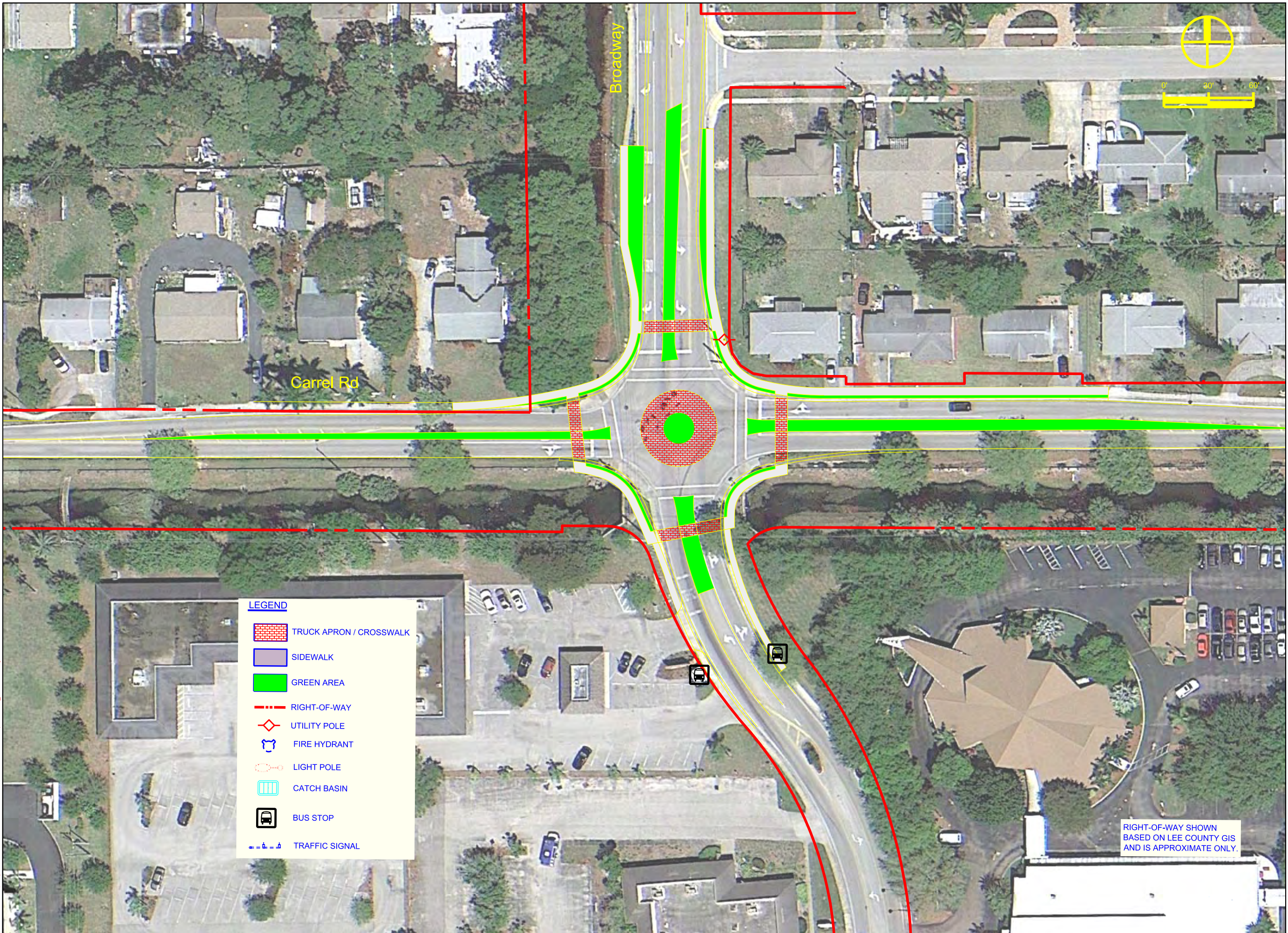
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Ortiz Ave &  
Tice St**

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**14**

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**LEGEND**

- TRUCK APRON / CROSSWALK
- SIDEWALK
- GREEN AREA
- RIGHT-OF-WAY
- UTILITY POLE
- FIRE HYDRANT
- LIGHT POLE
- CATCH BASIN
- BUS STOP
- TRAFFIC SIGNAL

RIGHT-OF-WAY SHOWN  
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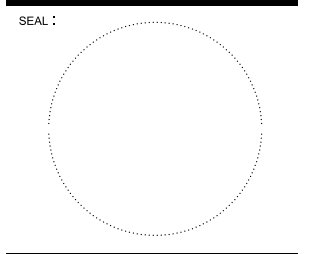
PROJECT NAME :

**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
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CAD FILE NO :  
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REVISIONS/SUBMISSIONS :

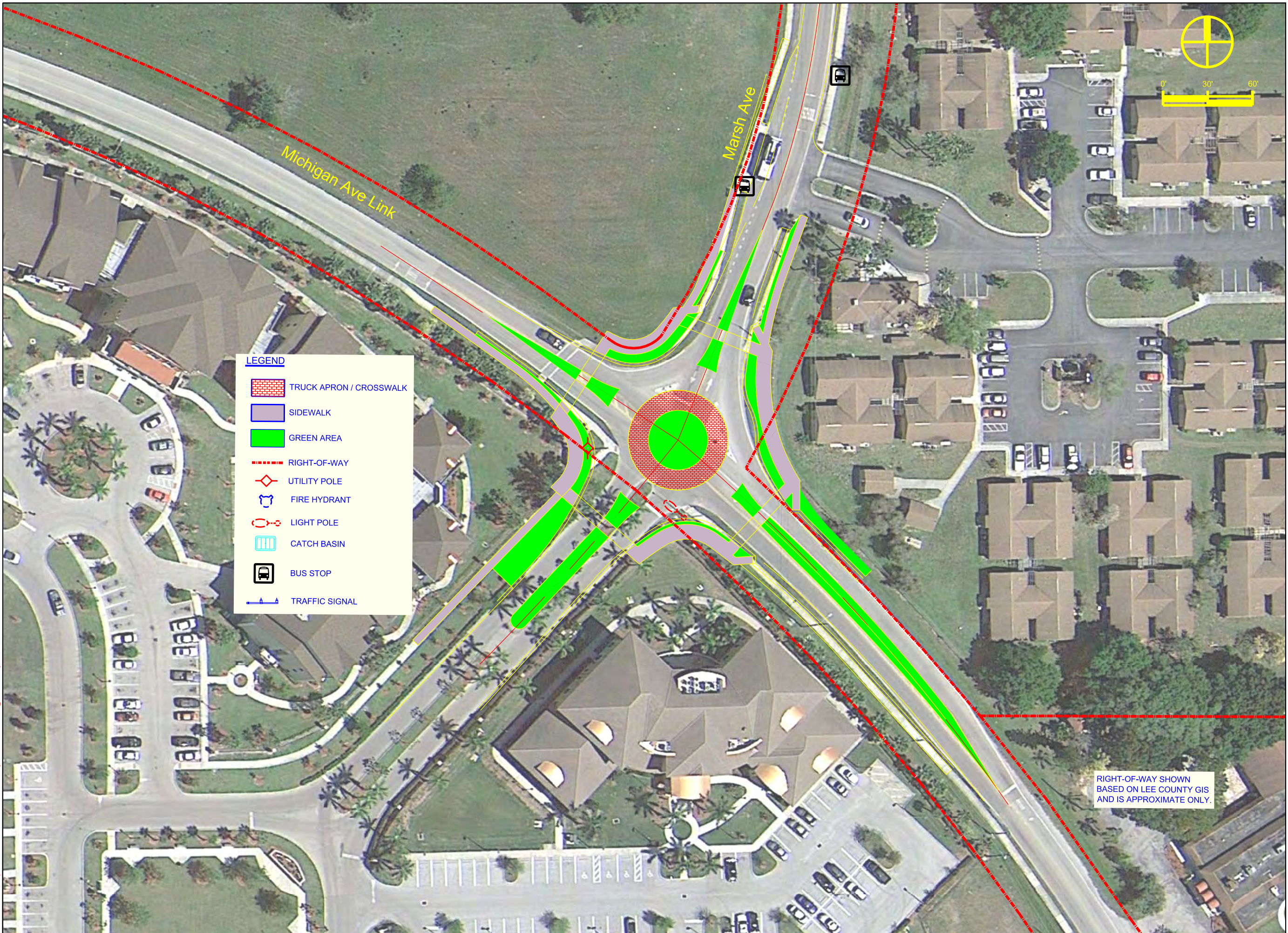
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DRAWING TITLE :  
**Roundabout Concept Plan  
Carrel Road &  
Broadway**

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**LEGEND**

- TRUCK APRON / CROSSWALK
- SIDEWALK
- GREEN AREA
- RIGHT-OF-WAY
- UTILITY POLE
- FIRE HYDRANT
- LIGHT POLE
- CATCH BASIN
- BUS STOP
- TRAFFIC SIGNAL

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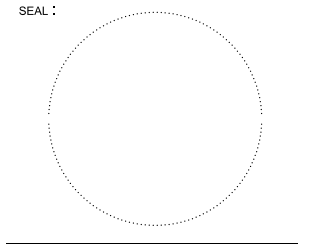
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www.leempo.com

PROJECT NAME :  
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
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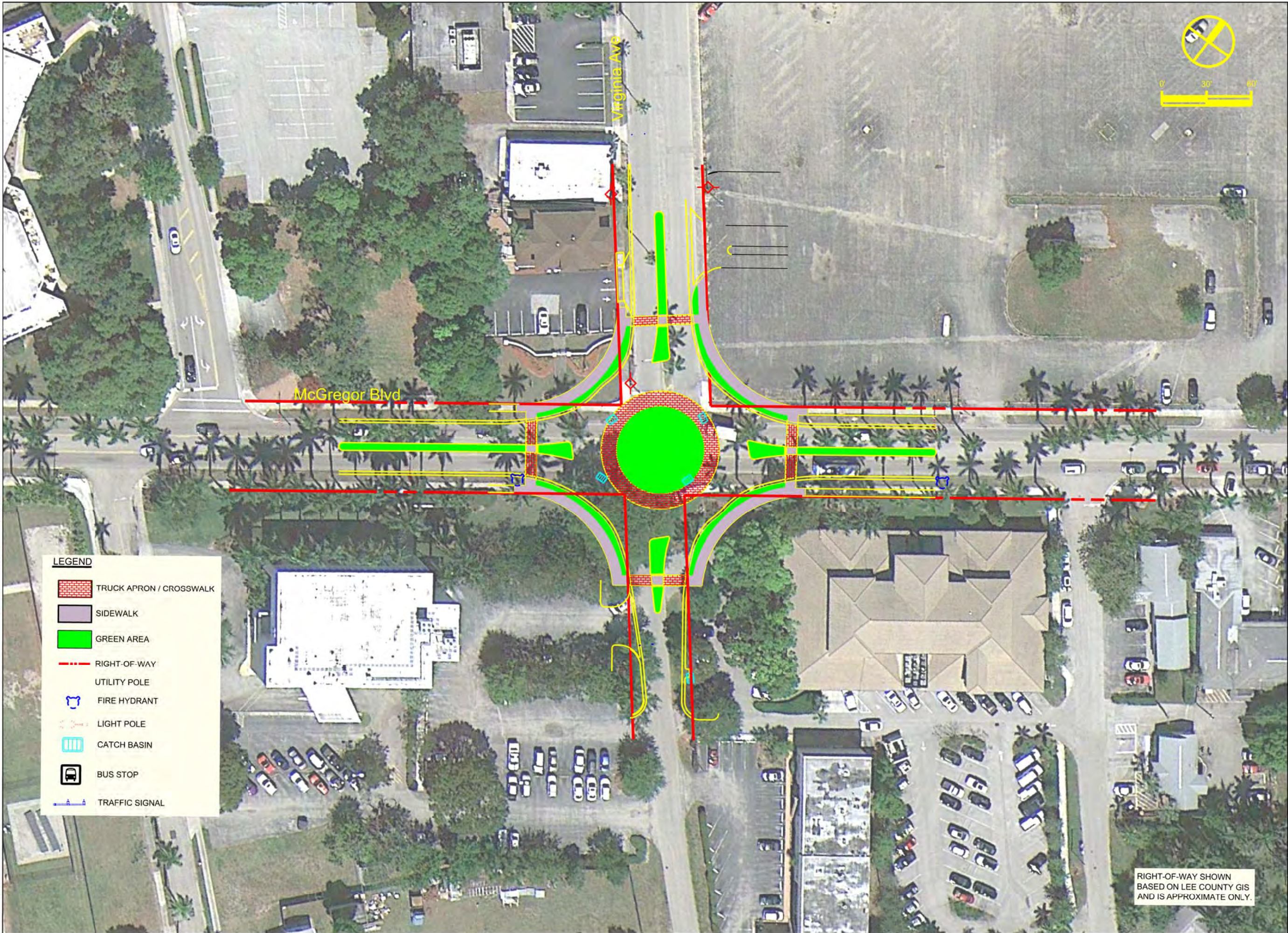
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DRAWING TITLE :  
**Roundabout Concept Plan  
Michigan Ave Link &  
Marsh Ave**

DRAWING NO :  
**16**



RIGHT-OF-WAY SHOWN  
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904-269-1851  
mjwallwork@comcast.net

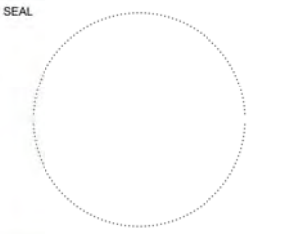


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**Lee County MPO  
Roundabout Study**

JOB NUMBER #14504  
DATE 11/03/2015  
CAD FILE NO  
AGENCY NO

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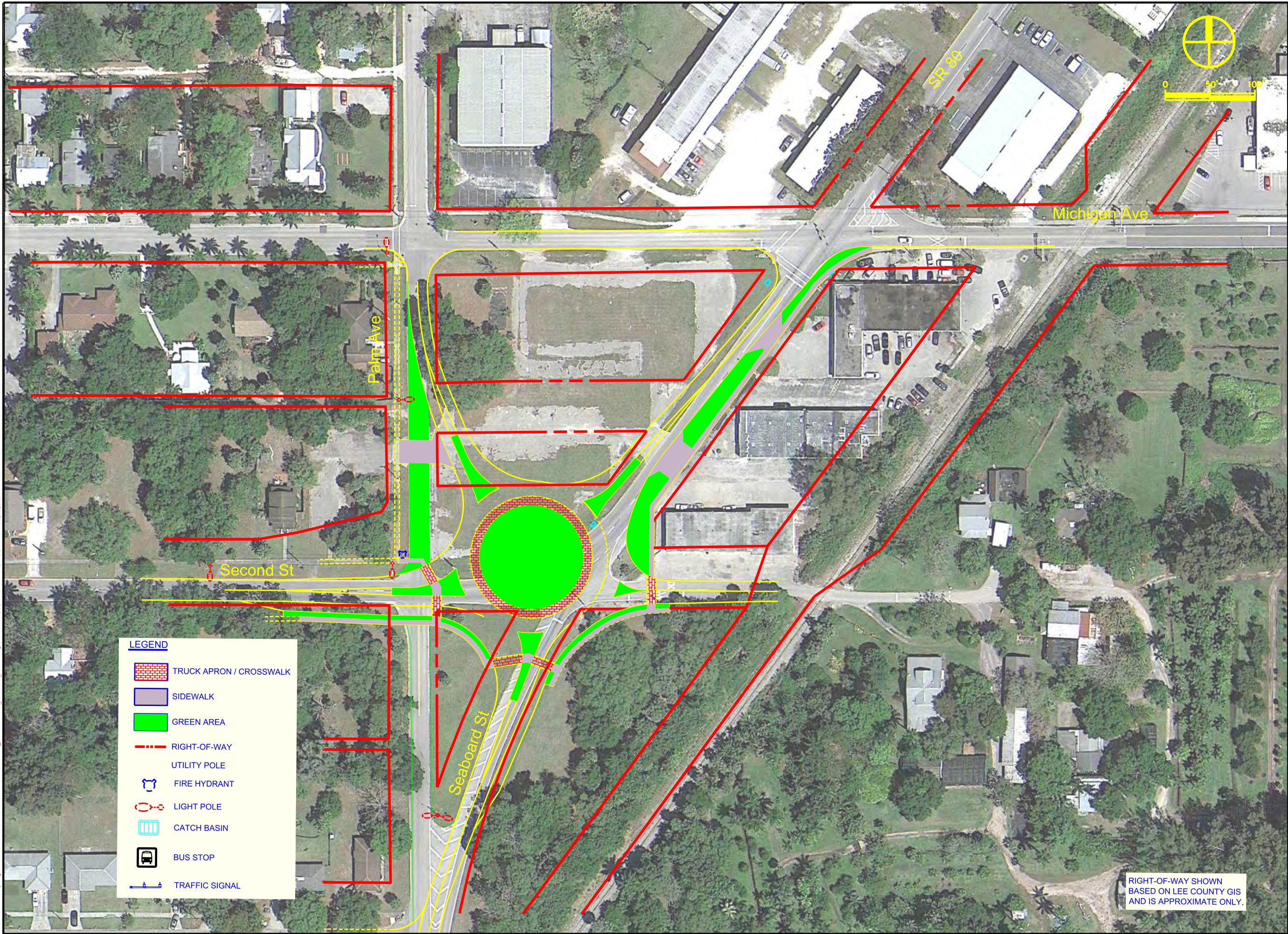
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**Roundabout Concept Plan  
McGregor Blvd &  
Virginia Ave**

DRAWING NO  
**17**

SCALE: 1" = 30'

**LEGEND**

- TRUCK APRON / CROSSWALK
- SIDEWALK
- GREEN AREA
- RIGHT-OF-WAY
- UTILITY POLE
- FIRE HYDRANT
- LIGHT POLE
- CATCH BASIN
- BUS STOP
- TRAFFIC SIGNAL



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RIGHT-OF-WAY SHOWN  
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FLORIDA REGISTRATION NUMBER: 2690



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Cape Coral, FL 33990  
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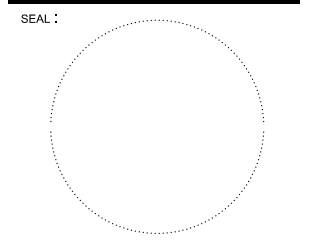
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**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
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AGENCY NO :

REVISIONS/SUBMISSIONS :

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DRAWING TITLE :  
**Roundabout Concept Plan  
SR 80 / Seaboard &  
Second St**

DRAWING NO :



**APPENDIX D**  
**OPERATIONAL ANALYSIS**

**Operational Analysis Summary**  
**Location 1: Buckingham Rd/Cemetery Rd**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro					SIDRA				
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	16.3	10.1	0.887	-	B	60.5%	-	-	-				
	Midday	-	90	19	2.149	-	A	47.6%	-	-	-				
	PM	-	7	2.4	0.351	-	B	58.7%	-	-	-				
Roundabout <sup>7</sup>	AM											A	4.0	2.3	0.367
	Midday											A	6.6	3.4	0.481
	PM											A	4.0	1.9	0.312
2040 Conditions		Highway Capacity Manual (HCM)				Synchro					SIDRA				
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	254.6	60.5	2.807	-	F	95.6%	-	-	-				
	Midday	-	1460.2	46.3	22.688	-	C	72.3%	-	-	-				
	PM	-	189.9	10.9	12.195	-	E	88.2%	-	-	-				
Traditional – Improvement <sup>6</sup>	AM	B	14.7	20.9	0.840	B	B	58.5%	15.2	650 (1034)	0.840				
	Midday	C	33.9	29	0.900	D	B	60.6%	37	16.1 (403)	0.910				
	PM	B	12.3	12.2	0.750	B	B	61.1%	15.6	15.3 (383)	0.760				
Roundabout <sup>7</sup>	AM											A	6.8	5.8	0.630
	Midday											B	19.6	21.4	0.925
	PM											A	6.6	4.7	0.555

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with 1 thru, 2 left turn lanes on SB approach; 1 thru, 1 right turn lane on NB approach; 1 left and 1 channelized right turn lane on EB approach.
- 7) Roundabout with 1 thru, 1 left turn lane on SB approach; 1 thru, 1 right turn lane on NB approach; 1 left and 1 channelized right turn lane on EB approach.

**Operational Analysis Summary**  
**Location 2: Buckingham Rd/ Gunnery Rd**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	7.7	3.8	0.578	-	C	65.1%	-	-	-				
	Midday	-	6.4	1.2	0.287	-	A	44.3%	-	-	-				
	PM	-	7.5	2.7	0.49	-	C	68.3%	-	-	-				
Roundabout <sup>7</sup>	AM											A	5.5	2.7	0.403
	Midday											A	4.2	1.3	0.245
	PM											A	5.5	2.2	0.339
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	93.3	39.3	1.483	-	G	107.4%	-	-	-				
	Midday	-	9.1	4.3	0.617	-	C	71.6%	-	-	-				
	PM	-	56	24.2	1.298	-	G	106.2%	-	-	-				
Traditional – Improvement <sup>6</sup>	AM	F	89.2	73.1	1.37	B	B	55.0%	18.1	10.8 (269)	0.88				
	Midday	C	22.1	14.3	0.88	B	A	45.3%	11.3	6.4 (161)	0.70				
	PM	F	157.2	72.4	1.93	C	D	73.2%	25.9	19.5 (487)	0.87				
Roundabout <sup>7</sup>	AM											B	10.6	11.0	0.741
	Midday											A	5.7	2.9	0.409
	PM											A	9.4	5.8	0.560

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with added left turn lanes for Buckingham SB and Gunnery NB.
- 7) Single lane roundabout.

**Operational Analysis Summary**  
**Location 3: Causeway Blvd/Periwinkle Way**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)					Synchro					SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	F	55.4	13	2.566	-	E	88.7%	-	-	-				
	Midday	F	53.3	12.7	1.819	-	C	70.9%	-	-	-				
	PM	F	61	12.3	3.125	-	F	96.9%	-	-	-				
Roundabout <sup>7</sup>	AM											A	2.5	1.5	0.702
	Midday											A	4.2	3.0	0.463
	PM											A	6.2	4.7	0.585
2040 Conditions		Highway Capacity Manual (HCM)					Synchro					SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	F	56.8	12.8	2.779	-	F	94.3%	-	-	-				
	Midday	F	54.7	12.4	2.040	-	D	74.8%	-	-	-				
	PM	F	64.1	12	3.444	-	G	102.9%	-	-	-				
Traditional – Improvement <sup>6</sup>	AM	B	14.2	5.3	0.59	B	A	51.3%	16.3	8.0 (199)	0.89				
	Midday	B	14.8	7.3	0.69	B	A	54.9%	15.3	9.7 (242)	0.71				
	PM	C	31.1	15.8	1.11	C	C	71.6%	21	15.0 (376)	0.87				
Roundabout <sup>7</sup>	AM											A	2.7	1.7	0.725
	Midday											A	4.7	3.5	0.495
	PM											A	6.5	4.7	0.586

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with two EB left turn lanes and combination thru/right; 1 right and 1 thru/left for NB and SB approaches; 1 left, 1 thru, and 1 right turn lane on WB approach.
- 7) Roundabout with 1 lane on NB approach, 1 thru/left lane and 1 right turn lane on WB and SB approaches, and 1 left turn lane and 1 left/thru/right lane on EB approach.

**Operational Analysis Summary**  
**Location 4: Altamonte Ave/West First St**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	3	0.4	0.131	-	A	37.4%	-	-	-				
	Midday	-	4	0.7	0.184	-	A	34.1%	-	-	-				
	PM	-	4	1	0.248	-	A	43.1%	-	-	-				
Roundabout <sup>7</sup>	AM											A	4.7	1.2	0.238
	Midday											A	4.4	1.2	0.228
	PM											A	5.4	2.1	0.359
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	12.6	4.7	0.703	-	B	55.9%	-	-	-				
	Midday	-	7.8	3.4	0.568	-	A	54.5%	-	-	-				
	PM	-	47.8	15	1.353	-	C	68.2%	-	-	-				
Traditional – Improvement <sup>6</sup>	AM	B	11.7	7.9	0.61	B	B	55.9%	13.6	8.3 (207)	0.68				
	Midday	B	11.5	7.9	0.63	B	A	54.5%	11.7	6.0 (150)	0.67				
	PM	B	13.6	15.5	0.70	B	C	68.2%	16.8	11.5 (287)	0.75				
Roundabout <sup>7</sup>	AM											A	7.6	2.7	0.416
	Midday											A	6.1	2.6	0.414
	PM											A	9.9	6.5	0.679

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signalized intersection with existing geometry.
- 7) Single lane roundabout.

**Operational Analysis Summary**  
**Location 5: Broadway/ Edison Ave**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	B	16.0	8.1	0.64	B	A	38.8%	15.5	8.2 (204)	0.41				
	Midday	B	14.5	5.2	0.43	B	A	35.8%	10.8	5.8 (144)	0.21				
	PM	B	17.6	7.9	0.65	C	A	50.0%	20.3	9.4 (236)	0.53				
Roundabout <sup>7</sup>	AM											A	4.9	1.5	0.263
	Midday											A	4.0	1.0	0.191
	PM											A	4.6	1.5	0.257
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	F	81.6	73.3	1.28	F	C	67.4%	93.3	39.2 (981)	1.34				
	Midday	C	22.2	19.4	0.86	C	B	56.0%	22.6	23.3 (582)	0.77				
	PM	D	53.3	46	1.07	D	D	76.8%	51.5	30.1 (753)	1.07				
Traditional – Improvement <sup>6</sup>	AM	C	22.0	26	0.86	C	B	61.3%	23.7	21.9 (547)	0.88				
	Midday	B	18.2	16.1	0.75	B	A	53.6%	18.2	16.4 (410)	0.71				
	PM	C	31.8	24.1	0.89	C	C	72.6%	29.8	22.9 (573)	0.87				
Roundabout <sup>7</sup>	AM											B	12.5	9.8	0.764
	Midday											A	7.2	4.1	0.535
	PM											B	12.0	11.9	0.793

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Added right turn lanes on EB and WB approaches. Signal retiming.
- 7) Single lane roundabout with right turn lanes on all approaches.

**Operational Analysis Summary**  
**Location 6: McGregor Blvd/Barcelona Ave/Alcazar Ave**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build <sup>6</sup>	AM	-	0.4	0.3	0.098	-	B	57.0%	-	-	-				
	Midday	-	0.9	0.7	0.194	-	A	52.4%	-	-	-				
	PM	-	0.4	0.4	0.129	-	C	65.2%	-	-	-				
Traditional – No Build <sup>7</sup>	AM	-	1.7	1.8	0.462	-	B	56.0%	-	-	-				
	Midday	-	0.7	0.5	0.146	-	B	58.3%	-	-	-				
	PM	-	1.3	1.5	0.372	-	C	65.0%	-	-	-				
Roundabout <sup>10</sup>	AM											A	7.4	4.8	0.554
	Midday											A	6.7	3.7	0.510
	PM											A	8.1	6.3	0.645
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build <sup>6</sup>	AM	-	3.1	2	0.517	-	B	62.4%	-	-	-				
	Midday	-	6.5	3.7	0.75	-	B	58.2%	-	-	-				
	PM	-	6	3.3	0.806	-	C	70.8%	-	-	-				
Traditional – No Build <sup>7</sup>	AM	-	13.4	5.6	1.462	-	B	62.4%	-	-	-				
	Midday	-	2.2	1.6	0.4	-	B	62.9%	-	-	-				
	PM	-	7.6	4.8	1.032	-	C	70.4%	-	-	-				
Traditional – Improvement <sup>8</sup>	AM	-	3.1	2	0.517	-	B	62.4%	-	-	-				
	Midday	-	6.5	3.7	0.75	-	B	58.2%	-	-	-				
	PM	-	6	3.3	0.806	-	C	70.8%	-	-	-				
Traditional – Improvement <sup>9</sup>	AM	A	6.2	18	0.72	A	B	63.2%	7.3	14.3 (358)	0.71				
	Midday	A	4.6	13.1	0.62	A	B	63.7%	4.8	10.0 (249)	0.61				
	PM	A	6.7	22.2	0.77	A	C	71.2%	8.4	17.8 (444)	0.79				
Roundabout <sup>10</sup>	AM											A	8.4	6.2	0.604
	Midday											A	7.2	5.2	0.555
	PM											A	9.3	9.1	0.707

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) McGregor/Barcelona - existing geometrics
- 7) McGregor/Alcazar - existing geometrics
- 8) McGregor/Barcelona - existing geometrics.
- 9) McGregor/Alcazar - Signal with existing geometrics.
- 10) McGregor/Barcelona/Alcazar - single lane roundabout.

**Operational Analysis Summary**  
**Location 7: MLK/Lee St/Thompson St/Central Ave**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro					SIDRA				
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				C	D	76.4%	20.8	44.0 (1099)	0.84				
	Midday					B	C	65.8%	15.4	19.7 (493)	0.62				
	PM					B	E	83.9%	18.1	21.4 (536)	0.61				
Roundabout <sup>7</sup>	AM										B	14.4	14.9	0.825	
	Midday										A	8.4	4.3	0.535	
	PM										B	11.2	8.2	0.711	
2040 Conditions		Highway Capacity Manual (HCM)				Synchro					SIDRA				
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				E	F	91.4%	73.0	65.9 (1648)	1.20				
	Midday					C	D	75.8%	24.6	34.0 (849)	0.89				
	PM					C	F	95.5%	27.6	39.1 (977)	0.82				
Traditional – Improvement <sup>6</sup>	AM	B	15.5	27.5	1.14	B	D	81.1%	10.5	22.9 (573)	0.82				
	Midday	A	5.9	14.9	0.59	A	C	69.9%	7.5	8.8 (219)	0.61				
	PM	A	7.9	16.7	0.59	B	D	77.2%	11.6	19.0 (476)	0.72				
Roundabout <sup>7</sup>	AM										C	30.0	83.0	0.994	
	Midday										B	11.3	7.5	0.677	
	PM										C	21.0	19.5	0.909	

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Elimination of Thompson Street approach. Signal retiming.
- 7) Mini roundabout, without Thompson Street approach.



**Operational Analysis Summary**  
**Location 8: Palm Beach Blvd/ Seaboard St**

Operational Analysis																									
2015 Conditions		Highway Capacity Manual (HCM)				Synchro				SIDRA															
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>										
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				-	A	54.2%	-	-	-														
	Midday					-	A	45.6%	-	-	-														
	PM					-	B	59.0%	-	-	-														
Roundabout <sup>7</sup>	AM Midday PM															Not Analyzed - Two Way Conversion									
2040 Conditions		Highway Capacity Manual (HCM)				Synchro				SIDRA															
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>										
Traditional – No Build	AM	Not Analyzed - Two Way Conversion				Not Analyzed - Two Way Conversion																			
	Midday																								
	PM																								
Traditional – Improvement <sup>6</sup>	AM	E	65.7	137.6	1.18	D	F	95.1%	54.9	69.4 (1734)	1.14														
	Midday	D	47.6	29.1	1.15	B	C	67.1%	17	20.6 (514)	0.70														
	PM	F	159.9	112.6	1.76	D	F	93.7%	49.3	59.6 (1489)	1.01														
Roundabout <sup>7</sup>	AM											C	20.8	26.7	0.909										
	Midday											A	3.9	3.7	0.539										
	PM											A	8.9	15.2	0.821										

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal, 2-way conversion, 4 legged intersection, dual NB right turn lanes and a thru/left; dual WB left turn lanes and a thru/right; SB left/thru/right; 1 left, 1 thru, 1 right turn lane EB.
- 7) Roundabout with 1 NB thru/left lane and 1 channelized right turn lane; 1 SB approach lane; 1 WB thru and 1 left turn lane; 2 EB approach lanes.

**Operational Analysis Summary**  
**Location 9: Palm Beach Blvd/ Joel Blvd**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	C	22.5	19.5	0.96	C	D	75.9%	21.1	17.3 (433)	0.96				
	Midday	A	9.8	4.8	0.57	A	B	60.7%	8.6	4.9 (122)	0.36				
	PM	B	14	13.8	0.72	B	B	61.4%	14.9	9.7 (243)	0.60				
Roundabout <sup>7</sup>	AM											A	6.1	2.3	0.415
	Midday											A	4.6	1.6	0.270
	PM											A	4.8	2.3	0.354
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	F	117.1	99.9	1.73	F	F	98.7%	94.1	50.8 (1271)	1.69				
	Midday	B	19.7	10.9	0.77	B	C	67.8%	17	12.6 (314)	0.57				
	PM	E	72.9	81.6	1.28	C	D	76.7%	32.8	19.4 (485)	1.00				
Traditional – Improvement <sup>6</sup>	AM	C	25	14.8	0.77	C	D	78.9%	23.1	16.3 (408)	0.73				
	Midday	B	14.7	8.8	0.55	B	B	63.2%	11.5	9.5 (237)	0.49				
	PM	C	25.7	35.2	0.99	B	C	66.5%	16.8	13.5 (337)	0.72				
Roundabout <sup>7</sup>	AM											B	16.7	13.4	0.803
	Midday											A	6.3	3.0	0.426
	PM											A	8.5	5.2	0.575

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with 1 left/ 2 thru/ 1 right turn lanes on EB approach; dual lefts and dual rights on NB approach; dual lefts and two thru lanes on WB approach; left/ thru/ right on SB approach.
- 7) Roundabout with 2 approach lanes and a channelized right turn on EB approach; 1 thru/left and 1 right turn lane on NB approach; 2 WB approach lanes; 1 SB approach lane.

**Operational Analysis Summary**  
**Location 10: US41/McGregor Blvd/ MLK Blvd/ Main St**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				F	F	97.0%	94.8	69.1 (1728)	1.25				
	Midday					D	C	68.8%	36.1	33.1 (828)	0.80				
	PM					D	C	73.0%	46	27.8 (696)	0.84				
Roundabout <sup>7</sup>	AM											B	13.7	10.9	0.817
	Midday											A	5.9	3.0	0.485
	PM											A	5.8	2.6	0.436
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				F	H	110.2%	144.3	83.1 (2078)	1.46				
	Midday					D	D	76.9%	45.2	42.8 (1069)	0.94				
	PM					D	D	79.9%	46.5	33.6 (839)	0.90				
Traditional – Improvement <sup>6</sup>	AM	HCM 2010 methodology does not support more than 4 approaches.				F	H	110.2%	117.9	76.8 (1921)	1.34				
	Midday					C	D	76.9%	32.9	26.6 (666)	0.99				
	PM					C	D	79.9%	31.9	21.3 (533)	0.98				
Roundabout <sup>7</sup>	AM											D	38.6	47.8	1.494
	Midday											A	7.2	4.6	0.580
	PM											A	7.3	4.0	0.532

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal Retiming.
- 7) Roundabout with 2 lane approach on US41 NB, US41 SB, Mcgregor EB, and Main St WB; 1 lane approach on MLK WB; US41 SB right turn lane channelized - circular roundabout.

**Operational Analysis Summary**  
**Location 11: Winkler Ave/ Challenger Blvd**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	7.8	1.4	0.333	-	A	33.2%	-	-	-				
	Midday	-	17.1	3.2	0.634	-	A	36.8%	-	-	-				
	PM	-	73.6	21.4	1.725	-	B	57.5%	-	-	-				
Roundabout <sup>7</sup>	AM											A	3.8	0.6	0.141
	Midday											A	3.8	0.7	0.181
	PM											A	4.8	1.1	0.249
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	1.7	20.5	2.002	-	B	57.7%	-	-	-				
	Midday	-	2.6	48.7	4.188	-	C	66.9%	-	-	-				
	PM	-	3.4	85.1	33.784	-	F	93.3%	-	-	-				
Traditional – Improvement <sup>6</sup>	AM	B	16.9	7.8	0.73	B	A	49.7%	15	4.4 (110)	0.62				
	Midday	C	24.4	14.7	0.9	B	A	54.1%	16.5	7.0 (175)	0.72				
	PM	F	108.4	79.9	1.78	C	D	73.1%	30.6	17.2 (429)	0.95				
Roundabout <sup>7</sup>	AM											A	5.5	1.5	0.294
	Midday											A	5.5	2.0	0.367
	PM											A	9.3	3.5	0.543

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with Challenger restored to 4 lanes and right turn lane added on WB approach.
- 7) 2-lane roundabout.

**Operational Analysis Summary**  
**Location 12: Colonial Blvd/ McGregor Blvd**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro					SIDRA				
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				D	E	85.5%	40	54.3 (1358)	0.92				
	Midday					C	D	75.1%	23.5	36.4 (909)	0.73				
	PM					D	F	94.6%	45.1	64.2 (1604)	0.94				
Roundabout <sup>7</sup>	AM											A	7.9	3.7	0.549
	Midday											A	6.5	2.4	0.468
	PM											A	9.7	4.2	0.680
Roundabout <sup>8</sup>	AM											B	10.1	12.5	0.763
	Midday											A	7.3	5.5	0.581
	PM											B	12.2	16.1	0.802
2040 Conditions		Highway Capacity Manual (HCM)				Synchro					SIDRA				
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				E	F	92.3%	58	64.7 (1618)	1.03				
	Midday					C	D	81.0%	34.8	40.0 (999)	0.87				
	PM					E	G	102.1%	67.8	71.2 (1781)	1.09				
Traditional – Improvement <sup>6</sup>	AM	HCM 2010 methodology does not support more than 4 approaches.				E	F	92.3%	60.3	53.6 (1341)	1.03				
	Midday					C	D	81.0%	34.3	27.7 (693)	1.01				
	PM					E	G	102.1%	65.4	56.4 (1411)	1.11				
Roundabout <sup>7</sup>	AM											A	9.7	5.7	0.595
	Midday											A	7.2	2.8	0.476
	PM											B	11.9	6.0	0.697
Roundabout <sup>8</sup>	AM											B	13.1	23.2	0.858
	Midday											A	8.7	8.4	0.686
	PM											B	17.4	39	0.913

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with retiming.
- 7) Roundabout at McGregor/Colonial with NB single lane approach, WB 2 lane approach, and SB 2 lane approach.
- 8) Roundabout at McGregor/San Marcos/Colonial with NB 2 lane approach, SB 2 lane approach, and EB single lane approach

**Operational Analysis Summary**  
**Location 13: Palm Beach Blvd/ Tice St**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				B	D	78.2%	11.9	12.6 (314)	0.52				
	Midday					B	C	69.0%	10.8	7.7 (193)	0.39				
	PM					C	F	94.0%	24	25.7 (642)	0.77				
Roundabout <sup>7</sup>	AM											A	5.0	2.2	0.358
	Midday											A	4.6	1.5	0.270
	PM											A	6.5	3.3	0.453
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	HCM 2010 methodology does not support more than 4 approaches.				B	F	94.1%	19.8	25.3 (632)	0.77				
	Midday					B	E	82.5%	15.4	12.9 (323)	0.56				
	PM					E	H	121.9%	61	43.9 (1098)	1.11				
Traditional – Improvement <sup>6</sup>	AM	HCM 2010 methodology does not support more than 4 approaches.				B	F	92.3%	16.2	17.4 (434)	0.81				
	Midday					B	D	81.8%	13.7	9.9 (248)	0.71				
	PM					C	H	118.6%	35	31 (775)	0.94				
Roundabout <sup>7</sup>	AM											A	6.9	4.0	0.513
	Midday											A	5.3	2.1	0.345
	PM											A	8.7	5.1	0.583

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) New York Dr converted to one way street. Out bound traffic closed off.
- 7) Roundabout with 1 lane approach on New York and Tice; 2 lane approach on SR80.

**Operational Analysis Summary**  
**Location 14: Tice St/ Ortiz Blvd**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	A	10	4.1	0.45	B	B	63.9%	11.3	3.9 (97)	0.50				
	Midday	A	8.8	4.9	0.41	A	A	47.5%	8.8	5.2 (130)	0.38				
	PM	A	9.5	6.3	0.47	B	C	68.9%	10.8	7.4 (185)	0.51				
Roundabout <sup>7</sup>	AM											A	6.3	1.8	0.326
	Midday											A	5.2	1.4	0.268
	PM											A	5.9	2.2	0.353
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	F	93.8	40.2	1.75	C	D	78.8%	25	10.8 (271)	0.76				
	Midday	D	39.1	23	0.99	B	D	75.1%	18	18.5 (462)	0.73				
	PM	F	102.1	42.7	2.08	C	F	96.0%	24.1	29.1 (728)	0.84				
Traditional – Improvement <sup>6</sup>	AM	B	15.5	11.6	0.64	B	C	65.5%	14.4	8.2 (205)	0.64				
	Midday	B	11.4	10.7	0.64	B	C	64.0%	12	11.1 (277)	0.67				
	PM	B	15.2	15.6	0.72	B	E	83.2%	14.5	14.8 (370)	0.75				
Roundabout <sup>7</sup>	AM											B	12.3	6.5	0.662
	Midday											A	8.2	3.6	0.508
	PM											B	11.3	5.5	0.627

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Added left turn lanes for EB and WB movements. Right turn lane added on EB approach.
- 7) Single lane roundabout with right turn lanes on NB and WB approaches.

**Operational Analysis Summary**  
**Location 15: Carrell Rd/ Broadway**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	A	8.5	4.1	0.41	A	A	49.6%	7.8	2.0 (50)	0.41				
	Midday	A	7.7	2.6	0.32	A	A	47.4%	7.2	2.0 (50)	0.28				
	PM	A	7.8	3.6	0.4	A	A	51.8%	7.5	2.7 (67)	0.29				
Roundabout <sup>7</sup>	AM											A	5.3	1.3	0.227
	Midday											A	5.5	1.6	0.267
	PM											A	5.8	1.7	0.283
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	A	9.4	5.1	0.44	A	A	53.0%	8.8	2.7 (67)	0.47				
	Midday	A	8	3.1	0.37	A	A	50.5%	8.2	2.6 (64)	0.36				
	PM	A	8.2	4.3	0.43	A	B	55.3%	8.1	3.6 (89)	0.33				
Traditional – Improvement <sup>6</sup>	AM	Improvement Not Necessary				Improvement Not Necessary									
	Midday	Improvement Not Necessary				Improvement Not Necessary									
	PM	Improvement Not Necessary				Improvement Not Necessary									
Roundabout <sup>7</sup>	AM											A	5.9	1.7	0.279
	Midday											A	6.2	2.0	0.317
	PM											A	6.6	2.2	0.341

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) N/A.
- 7) Single lane roundabout.



**Operational Analysis Summary**  
**Location 16 Michigan Ave/ Marsh Ave**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	5.6	2	0.421	-	A	44.5%	-	-	-				
	Midday	-	4.2	0.5	0.155	-	A	39.7%	-	-	-				
	PM	-	5.2	1.2	0.285	-	B	56.0%	-	-	-				
Roundabout <sup>7</sup>	AM											A	5.2	2.1	0.344
	Midday											A	4.1	1	0.203
	PM											A	5.2	2	0.338
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	48.8	15.3	1.441	-	C	69.4%	-	-	-				
	Midday	-	5.7	1.8	0.386	-	A	50.2%	-	-	-				
	PM	-	21.4	8.1	1.005	-	C	67.3%	-	-	-				
Traditional – Improvement <sup>6</sup>	AM	A	8.8	4.5	0.67	C	C	64.4%	27	20.5 (512)	0.88				
	Midday	A	5.9	2.5	0.36	A	A	46.9%	8.9	5.3 (132)	0.48				
	PM	A	6.9	4.7	0.52	B	B	63.3%	14.9	14.2 (354)	0.72				
Roundabout <sup>7</sup>	AM											A	9.1	6.4	0.652
	Midday											A	5.9	2.8	0.419
	PM											A	8.5	5.8	0.624

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with existing geometrics.
- 7) Single lane roundabout.

**Operational Analysis Summary**  
**Location 17: McGregor Blvd/ Virginia Ave**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	2.6	1.6	0.36	-	A	46.1%	-	-	-				
	Midday	-	2.6	1.6	0.375	-	A	50.0%	-	-	-				
	PM	-	23	10.9	1.196	-	B	56.6%	-	-	-				
Roundabout <sup>7</sup>	AM											A	9.5	5.3	0.61
	Midday											A	9.6	6.9	0.65
	PM											A	1	8.6	0.71
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	72.2	20.4	1.8	-	B	63.6%	-	-	-				
	Midday	-	315.6	34.6	5.241	-	C	68.1%	-	-	-				
	PM	-	936.1	59.8	12.623	-	D	77.5%	-	-	-				
Traditional – Improvement <sup>6</sup>	AM	B	15.9	17.4	0.78	B	B	63.6%	10.4	12.9 (323)	0.73				
	Midday	B	17.7	22.7	0.79	B	C	68.1%	18.5	20.8 (520)	0.84				
	PM	D	48	72.2	1.05	D	D	77.5%	40.6	29.0 (724)	1.03				
Roundabout <sup>7</sup>	AM											B	14.2	8.9	0.75
	Midday											B	19.4	20.2	0.91
	PM											A	5.5	23.8	0.93

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with existing geometrics.
- 7) Single lane roundabout.

**Operational Analysis Summary**  
**Location 18: Palm Ave/ Second St**

Operational Analysis															
2015 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	-	-	-	-	-	A	35.3%	-	-	-				
	Midday	-	-	-	-	-	A	30.1%	-	-	-				
	PM	-	-	-	-	-	A	38.3%	-	-	-				
Roundabout <sup>7</sup>	AM											Not Analyzed - Two Way Conversion			
	Midday														
	PM														
2040 Conditions		Highway Capacity Manual (HCM)				Synchro						SIDRA			
Option	Peak Hour	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	ICU LOS <sup>1</sup>	ICU <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>5</sup>	V/C <sup>4</sup>	LOS <sup>1</sup>	Delay <sup>2</sup>	Queue <sup>3</sup>	V/C <sup>4</sup>
Traditional – No Build	AM	Not Analyzed - Two Way Conversion				Not Analyzed - Two Way Conversion									
	Midday														
	PM														
Traditional – Improvement <sup>6</sup>	AM	B	13.4	21.9	0.78	B	C	67.3%	14.7	22.1 (553)	0.75				
	Midday	B	11.4	14.6	0.76	B	A	52.5%	14.8	16.1 (403)	0.72				
	PM	C	20.6	34.7	0.89	C	C	71.9%	23.8	38.6 (966)	0.90				
Roundabout <sup>7</sup>	AM											A	9.9	10	0.75
	Midday											A	5.7	3.1	0.45
	PM											A	8.9	7.3	0.70

**Footnotes:**

- 1) Based on the overall intersection.
- 2) Based on the overall intersection, units are in seconds per vehicle.
- 3) Based on the worst lane group of the worst approach, units are in number of vehicles.
- 4) Based on the worst lane group of the worst approach.
- 5) Based on the worst lane group of the worst approach, units are in number of vehicles and (feet).  
Vehicles to feet conversion based on average vehicle length of 25 feet.
- 6) Signal with WB and EB left turn lanes at the intersection of Palm Ave / Second St.
- 7) 5 legged, single lane roundabout with left turn lane on NB approach and right turn lane on EB approach.

**APPENDIX E**

**30% DESIGN PLANS**

**PERIWINKLE WAY / CAUSEWAY BOULEVARD / LINDGREN BOULEVARD**

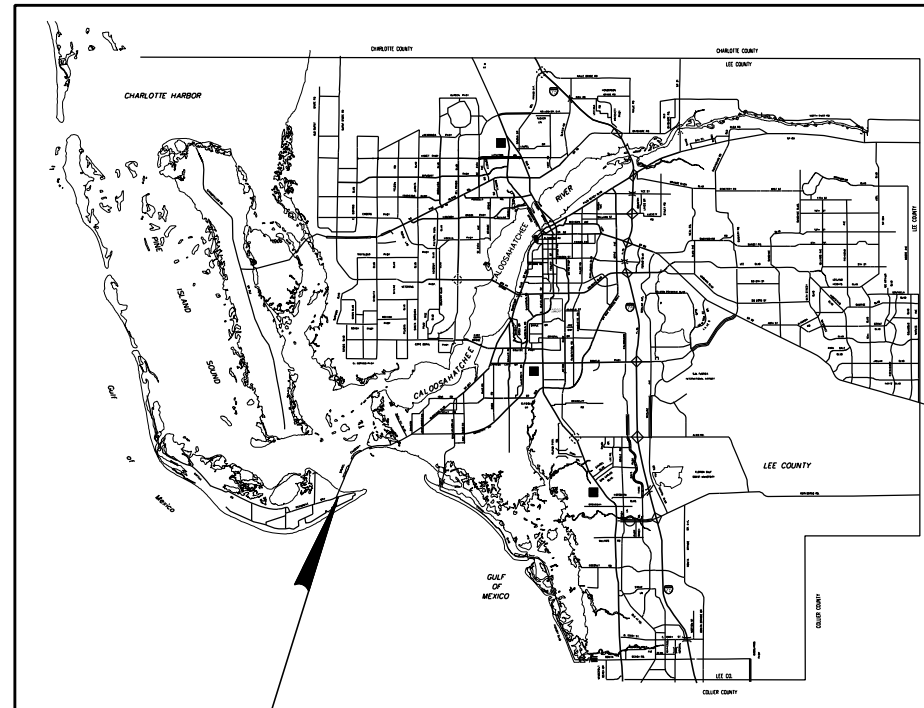
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# CONTRACT PLANS FOR ROUNDBOUT AT PERIWINKLE WAY AND LINDGREN BOULEVARD CITY OF SANIBEL, FLORIDA

## INDEX OF PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2	TYPICAL SECTION
3-7	ROADWAY PLANS
8-12	GRADING PLANS
13-17	SIGNING AND PAVEMENT MARKING PLANS

GOVERNING STANDARDS AND SPECIFICATIONS:  
FLORIDA DEPARTMENT OF TRANSPORTATION,  
DESIGN STANDARDS FY 2016-17,  
AND STANDARD SPECIFICATIONS FOR ROAD AND  
BRIDGE CONSTRUCTION DATED JULY 2016,  
AS AMENDED BY CONTRACT DOCUMENTS.



PROJECT LOCATION

PREPARED FOR:  
LEE COUNTY  
METROPOLITAN PLANNING ORGANIZATION

**30% PLANS**



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AND  
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mjwallwork@comcast.net



815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
www.leempo.com

PROJECT NAME :

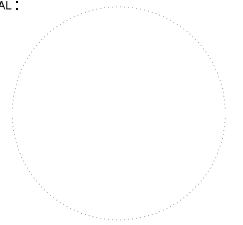
**Lee County MPO  
Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
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**KEYSHEET**

DRAWING NO.:



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JOB NUMBER : #14504 DATE : 11/03/2015 CAD FILE NO : AGENCY NO :

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Table with 2 columns: Revisions/Submissions (indicated by triangles) and Description.

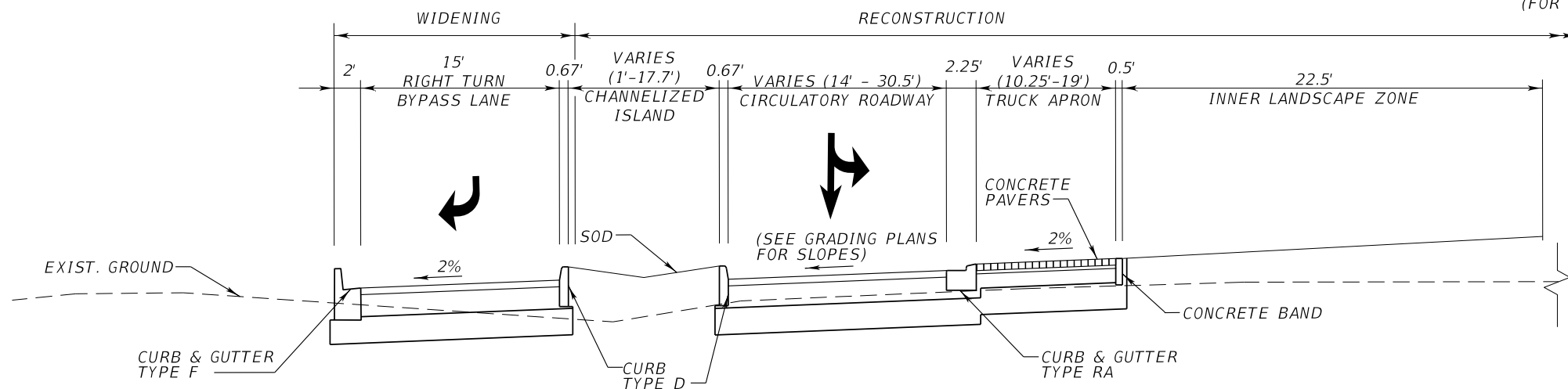
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TYPICAL SECTION

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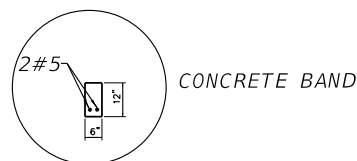
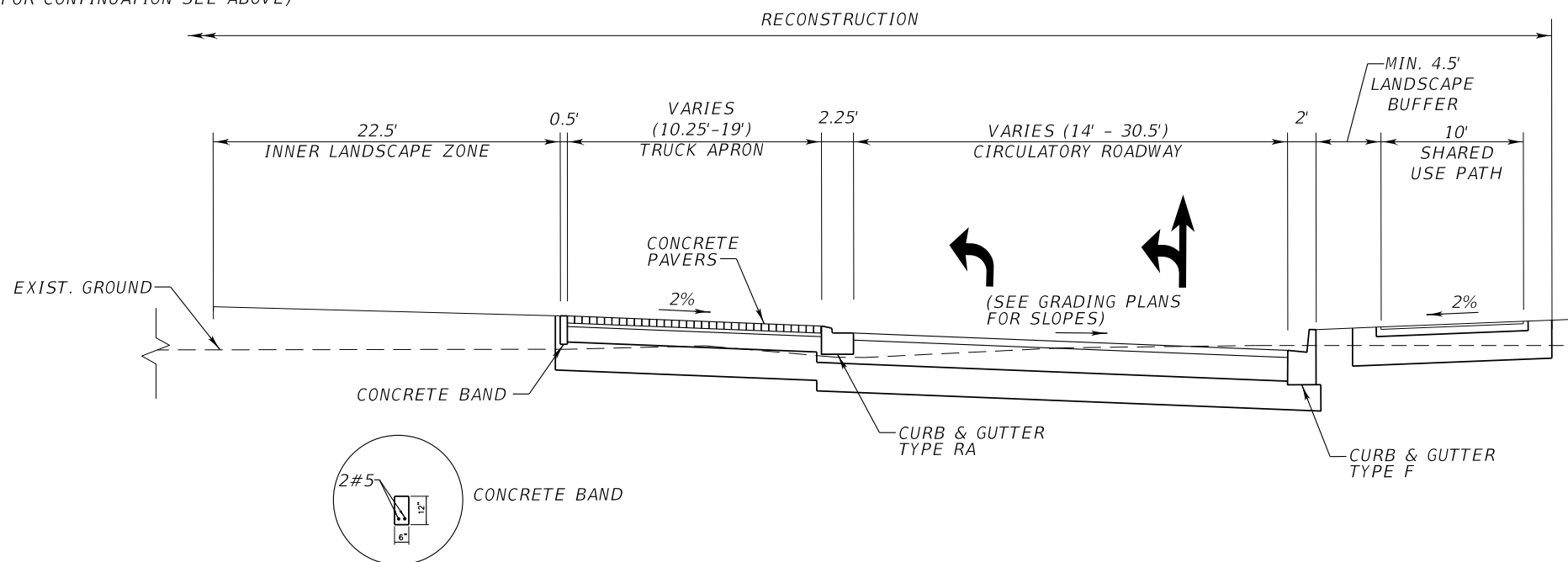
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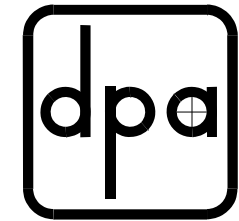
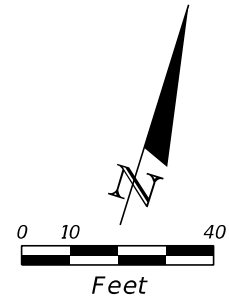
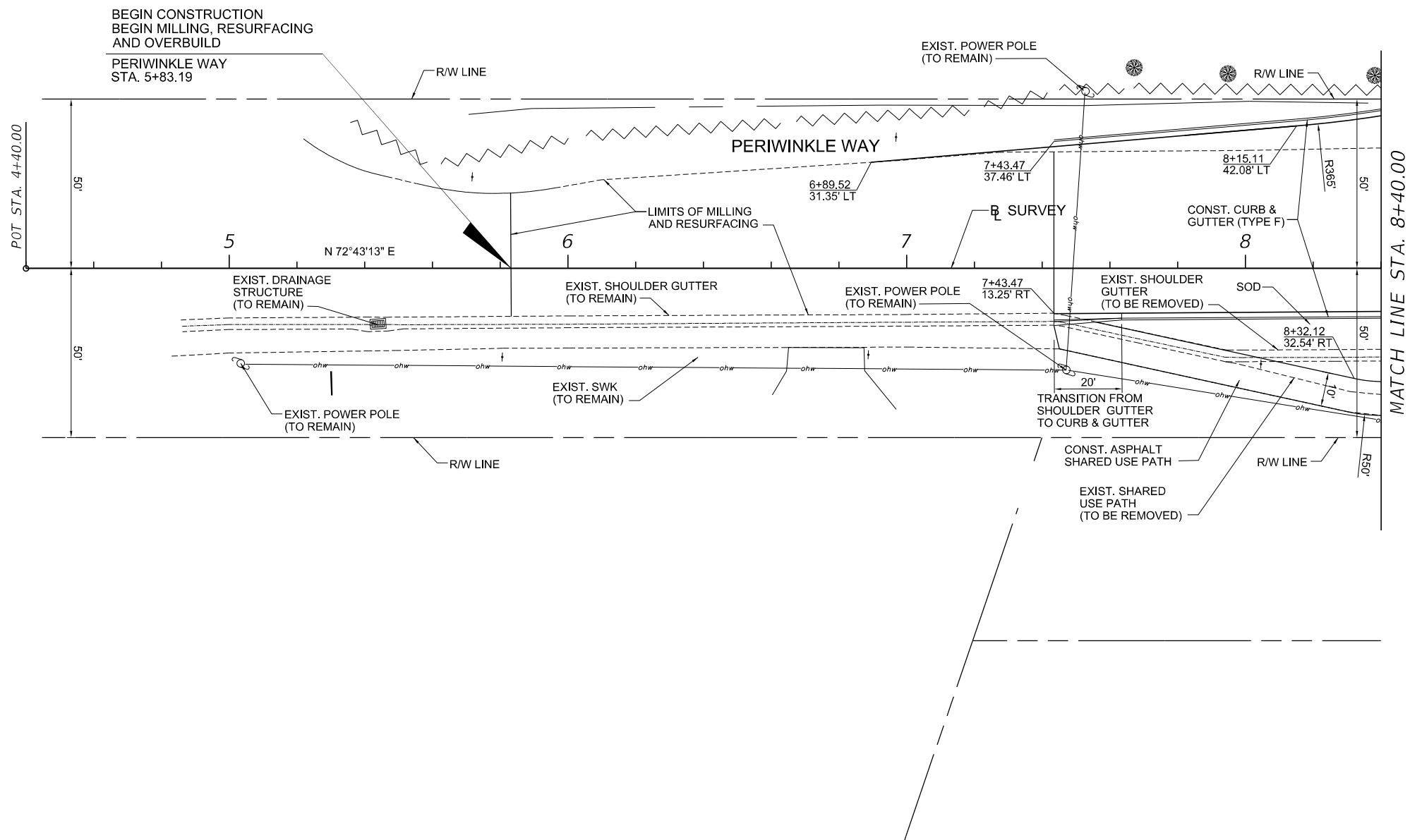
COLOR SAMPLES AND SPECIFICATIONS OF THE PAVERS SHALL BE SUBMITTED TO THE CITY OF SANIBEL FOR APPROVAL PRIOR TO INSTALLATION.

- CIRCULATORY ROADWAY & BYPASS LANE: TYPE B STABILIZATION (LBR 40) 12" OPTIONAL BASE GROUP 9 WITH TYPE SP STRUCTURAL COURSE (TRAFFIC C) 2" AND FRICTION COURSE FC-9.5 (TRAFFIC C) (1") (PG-76-22) (ARB)
TRUCK APRON: TYPE B STABILIZATION (LBR 40) 12" OPTIONAL BASE GROUP 4 COMPACTED CONSTRUCTION SAND 2" WITH CONCRETE PAVERS
SHARED USE PATH: TYPE B STABILIZATION (LBR 40) 12" OPTIONAL BASE GROUP 1 WITH SP STRUCTURAL COURSE (TRAFFIC A) 1"
SOD: A-3 MATERIAL (UP TO 2 FEET DEEP) THE TOP LAYER SHALL BE 6" FINISH SOIL LAYER

(FOR CONTINUATION SEE ABOVE)



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PROJECT NAME :

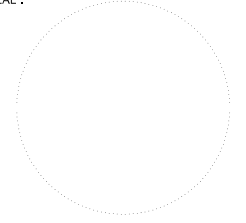
**Lee County MPO  
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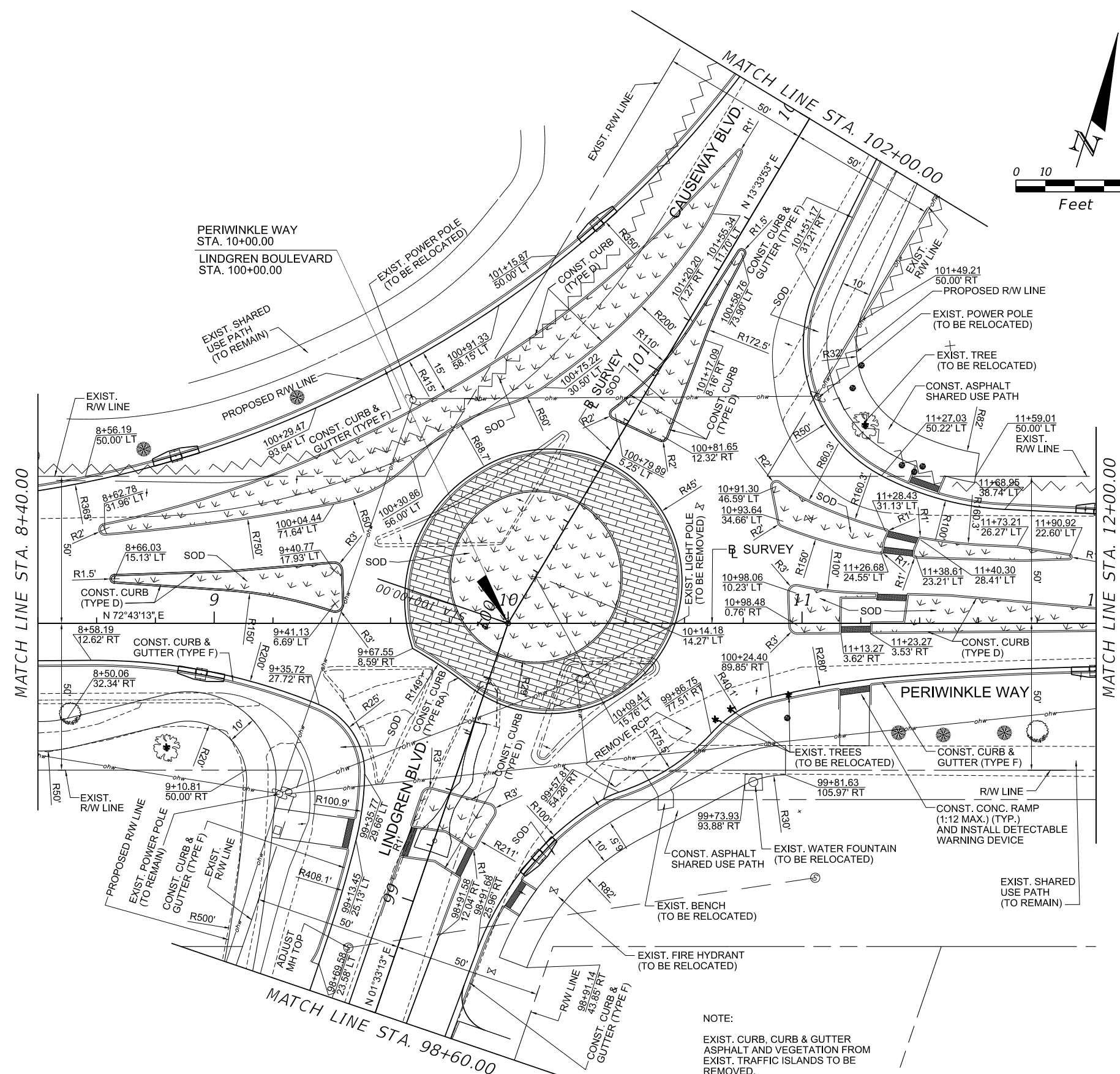
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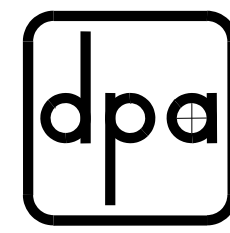
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NOTE:  
 EXIST. CURB, CURB & GUTTER  
 ASPHALT AND VEGETATION FROM  
 EXIST. TRAFFIC ISLANDS TO BE  
 REMOVED.

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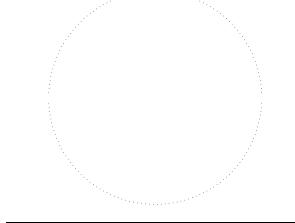
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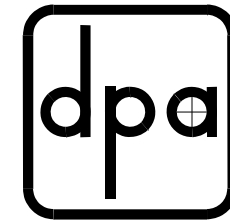
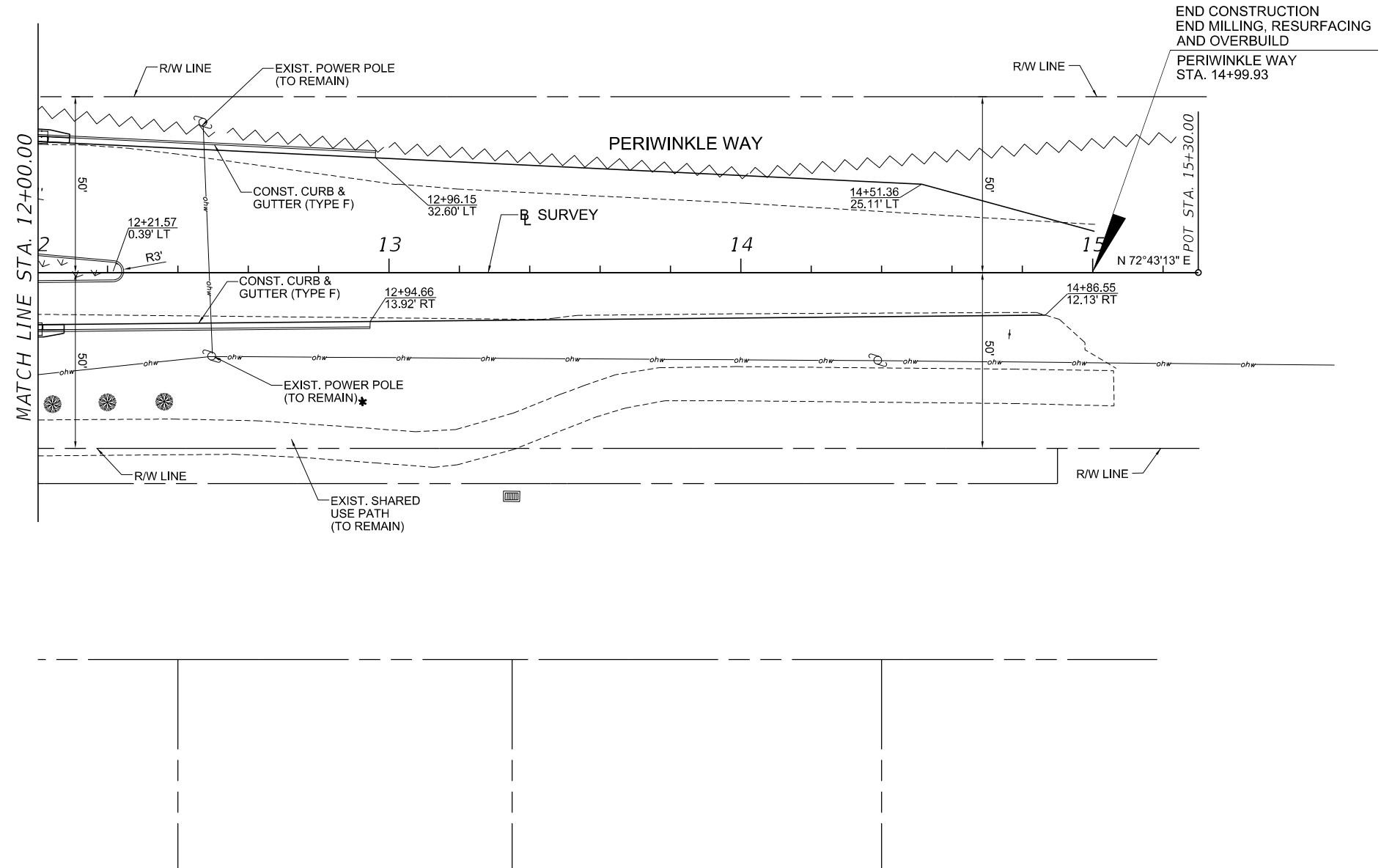
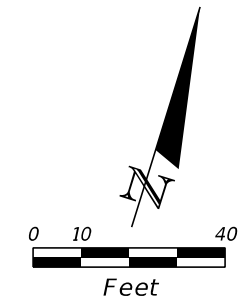
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**ROADWAY PLAN**

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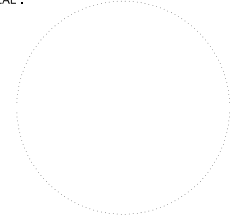
**Lee County MPO  
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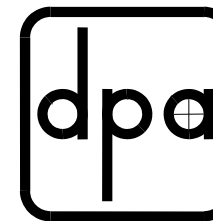
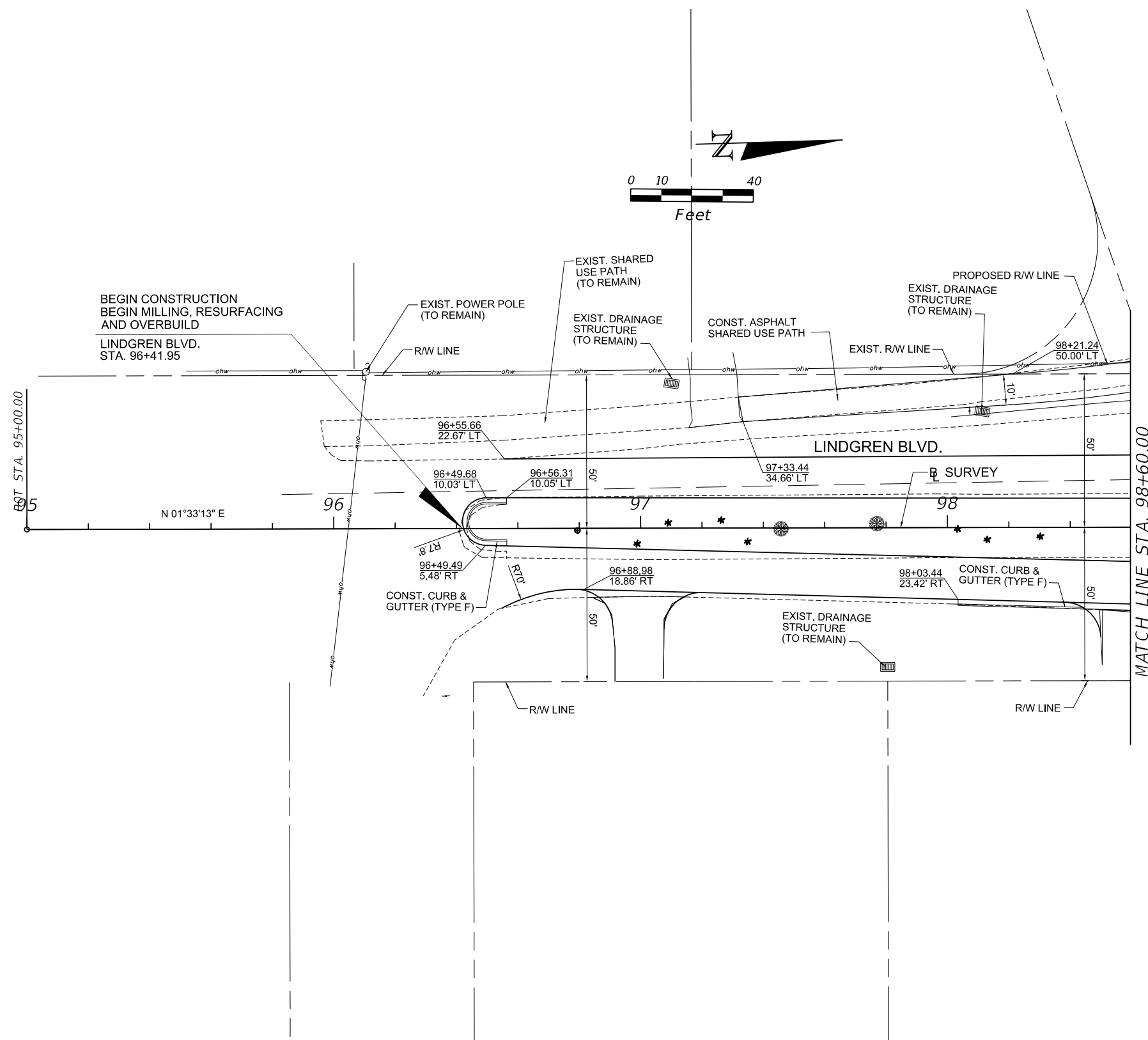


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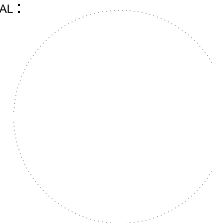
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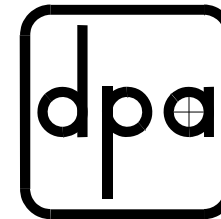
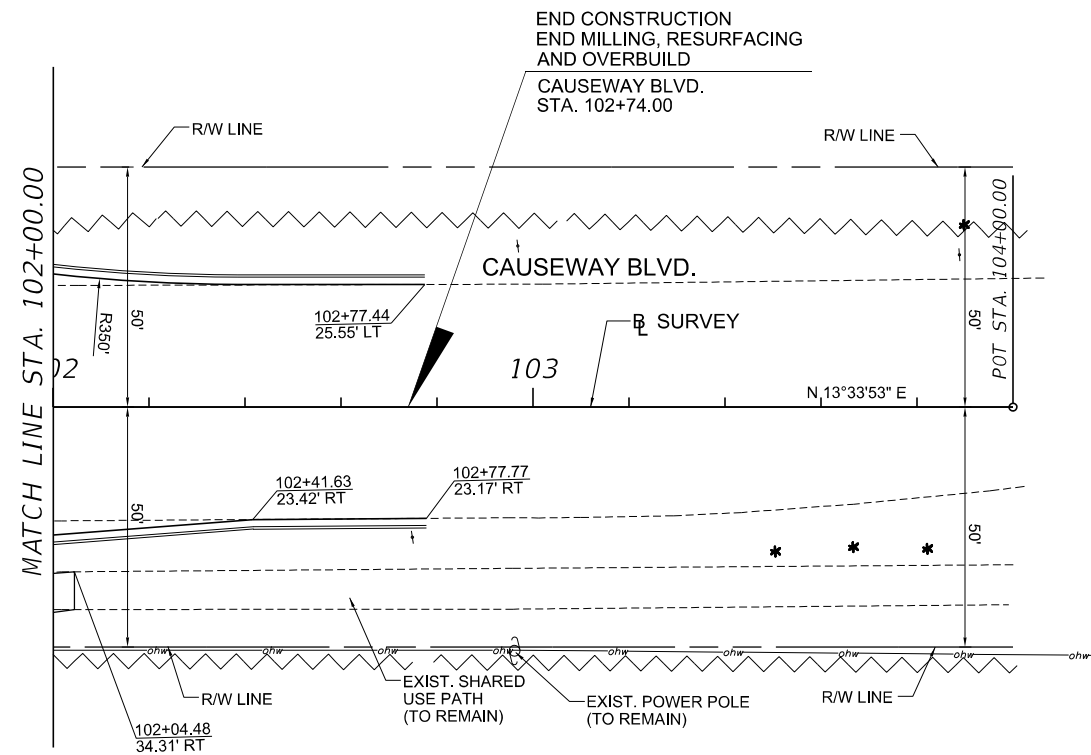
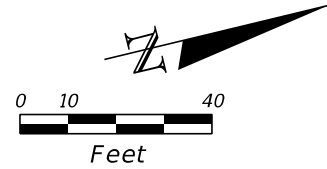


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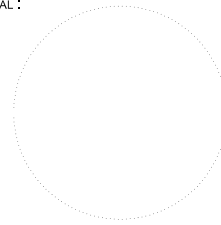
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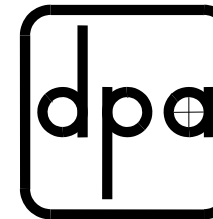
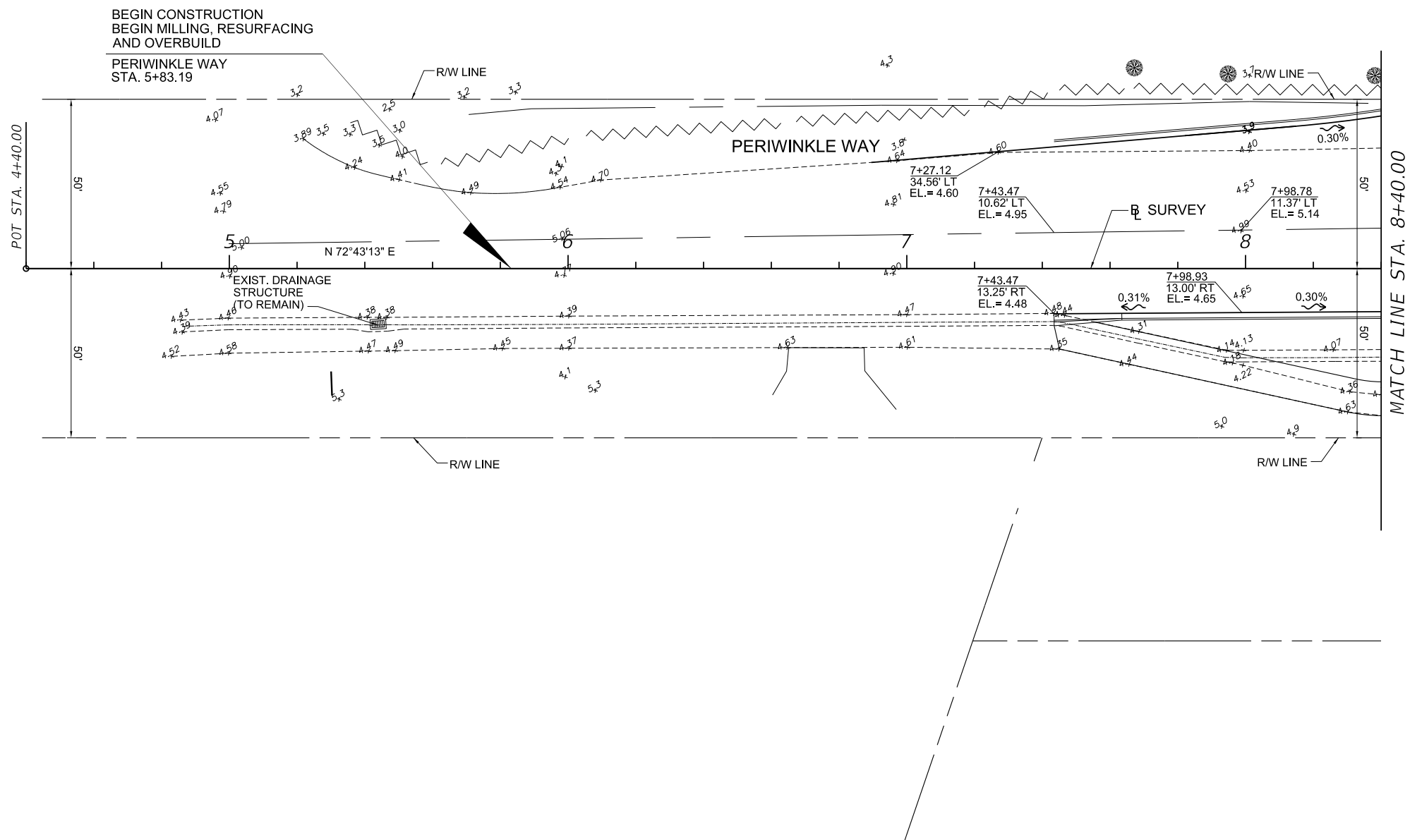


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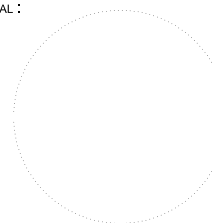
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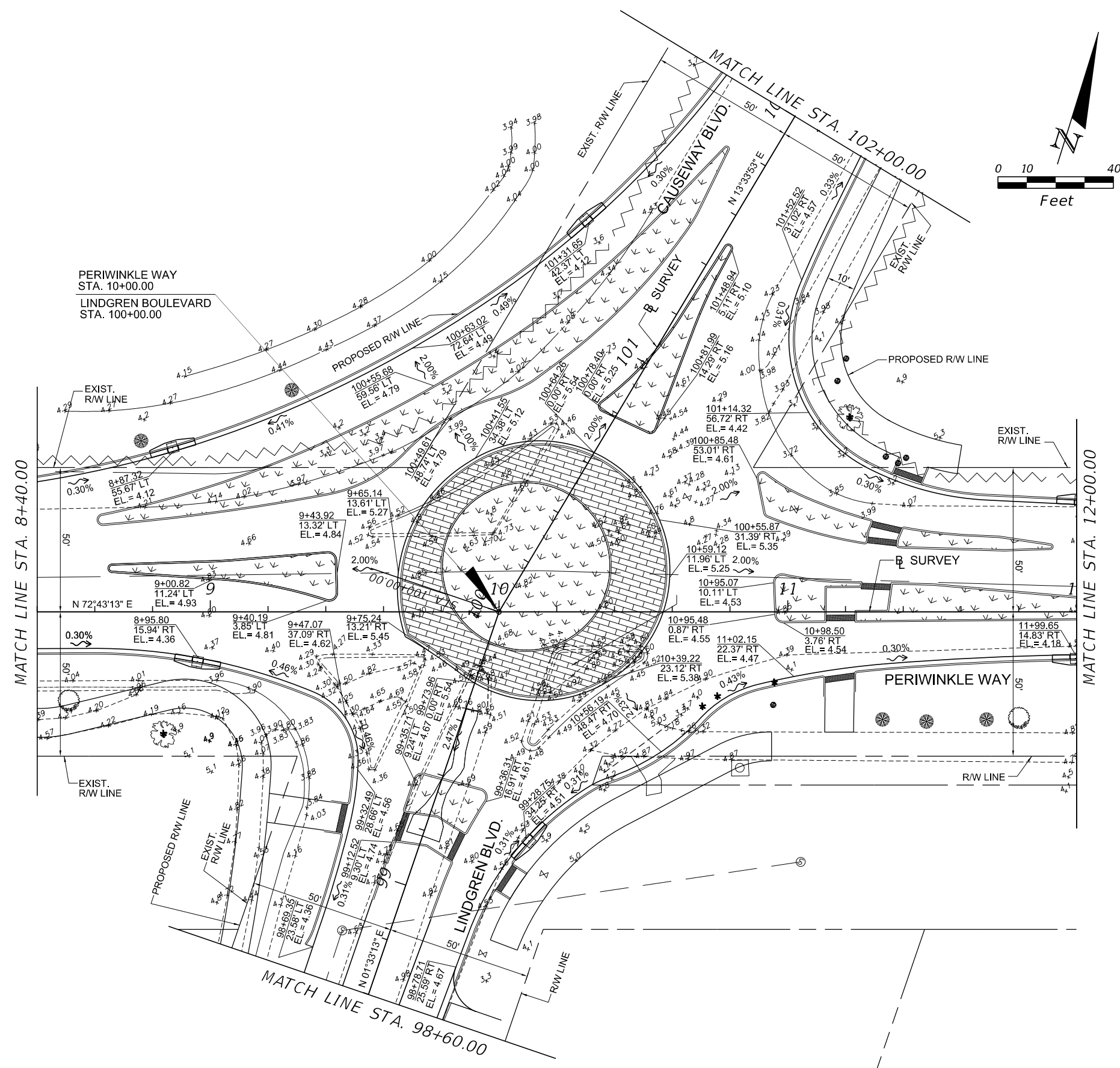
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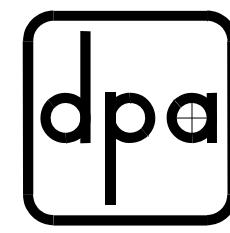
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**GRADING PLAN**

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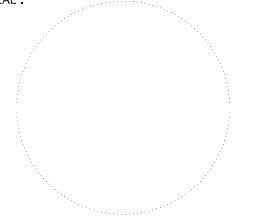
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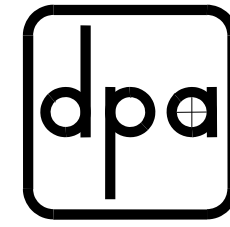
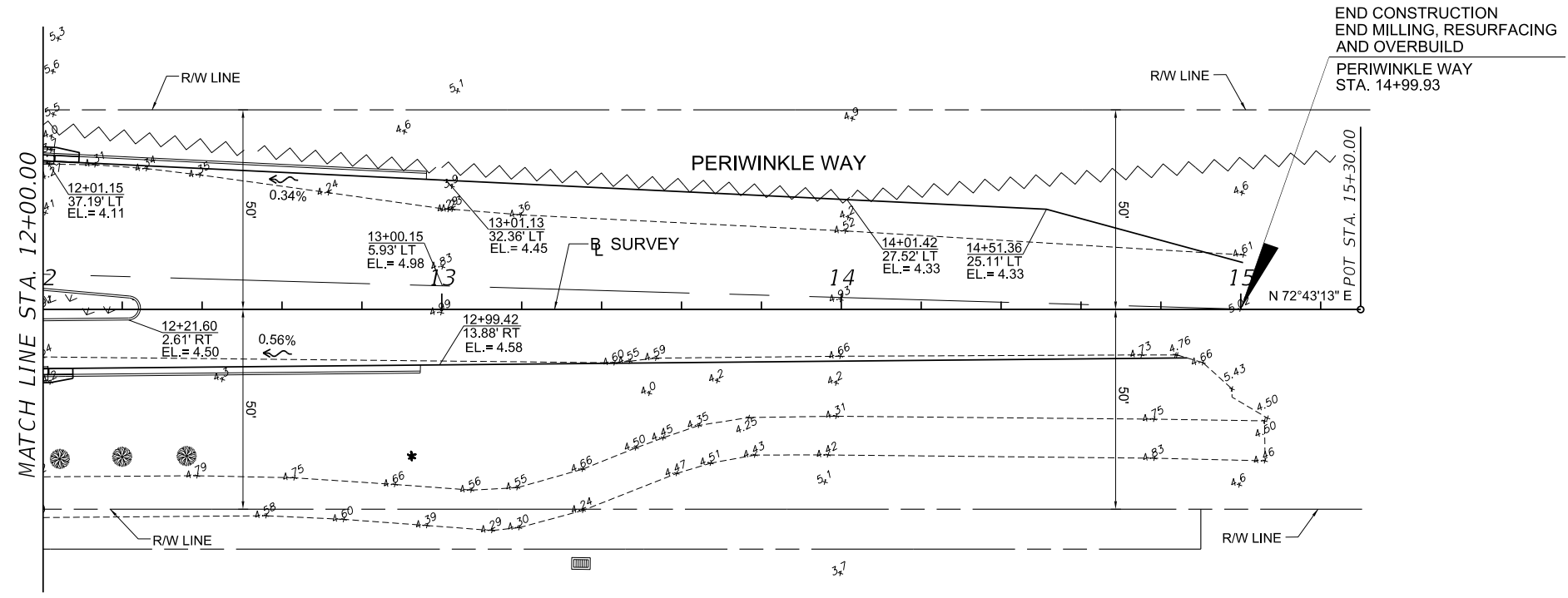
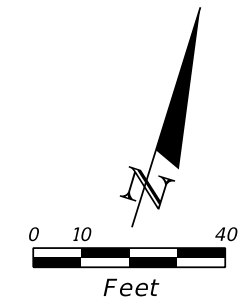


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AND  
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2149 McGregor Boulevard  
Fort Myers, Florida 33901  
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dpa@dplummer.com  
FLORIDA REGISTRATION NUMBER: 2690



**Alternate Street Design, PA.**  
1516 Plainfield Avenue, Orange Park, FL 32073  
904-269-1851  
mjwallwork@comcast.net



815 Nicholas Pkwy E.  
Cape Coral, FL 33990  
(239) 244-2220  
www.leempo.com

PROJECT NAME :

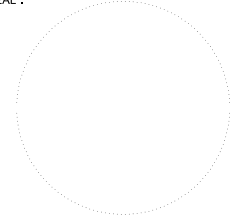
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Roundabout Study**

JOB NUMBER : #14504  
DATE : 11/03/2015  
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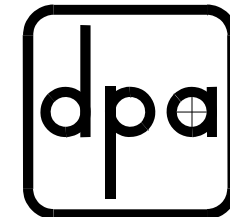
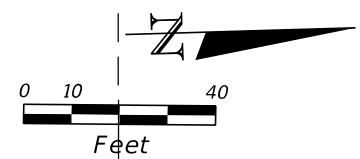
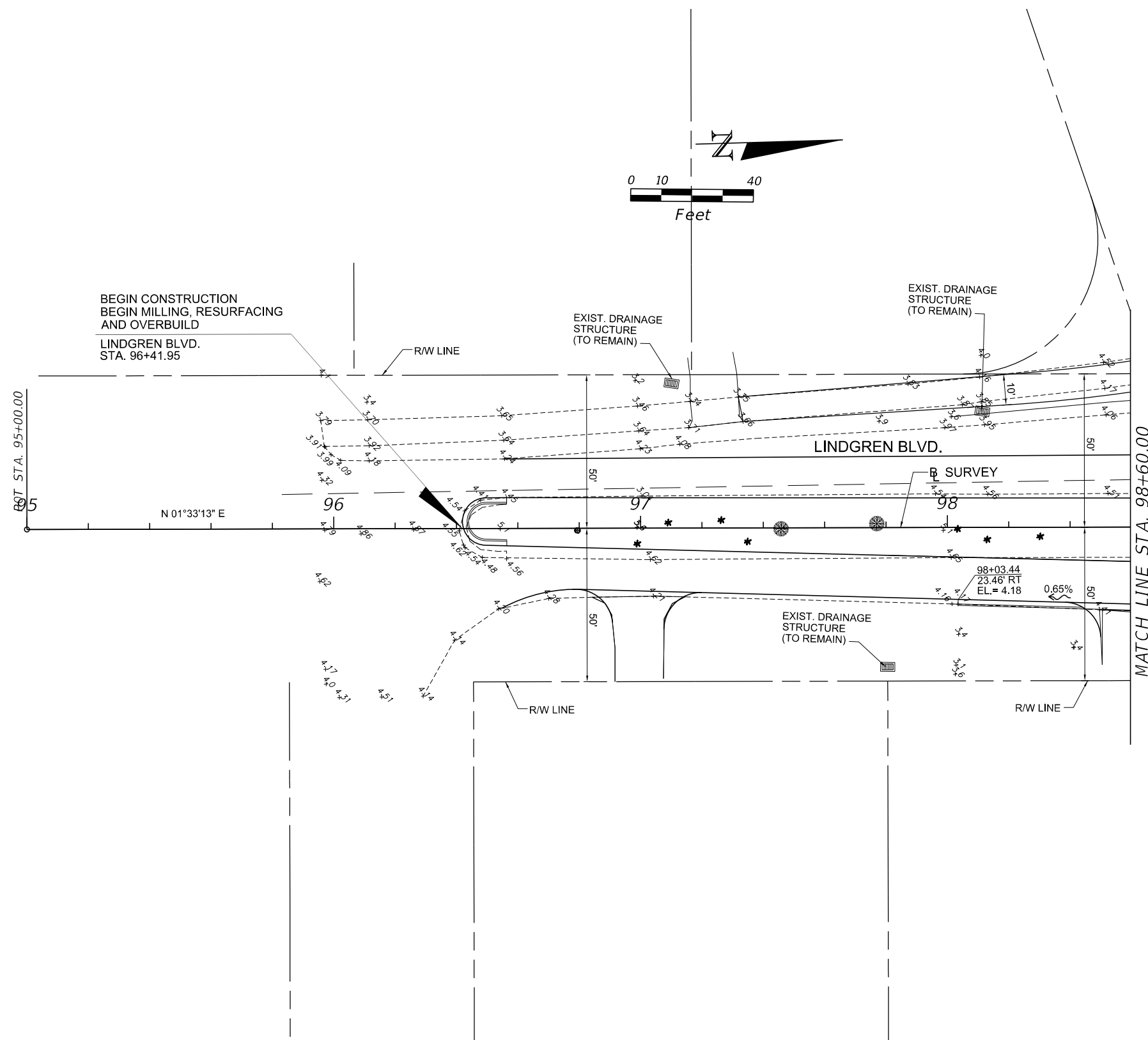


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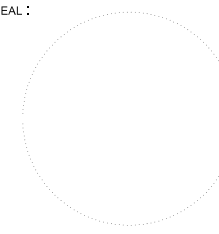
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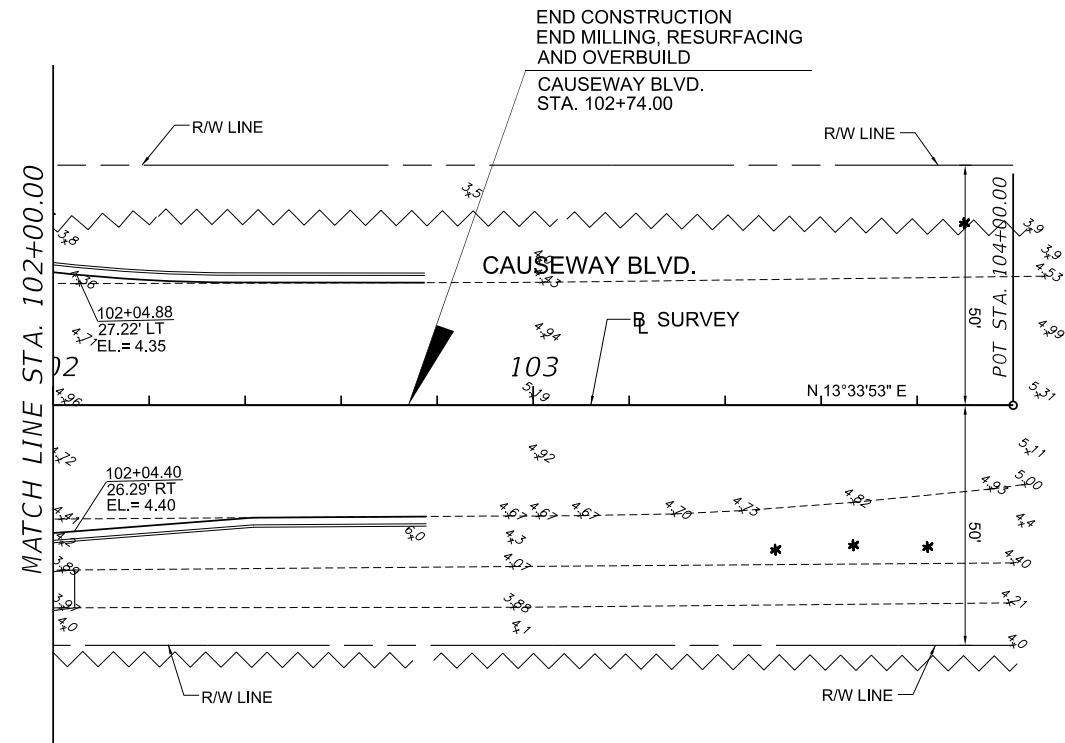
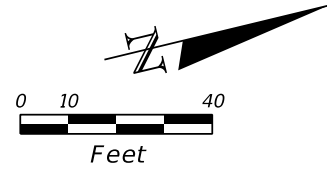
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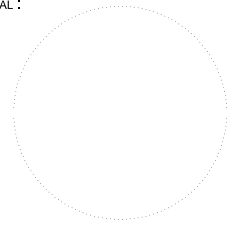
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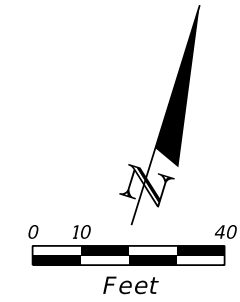
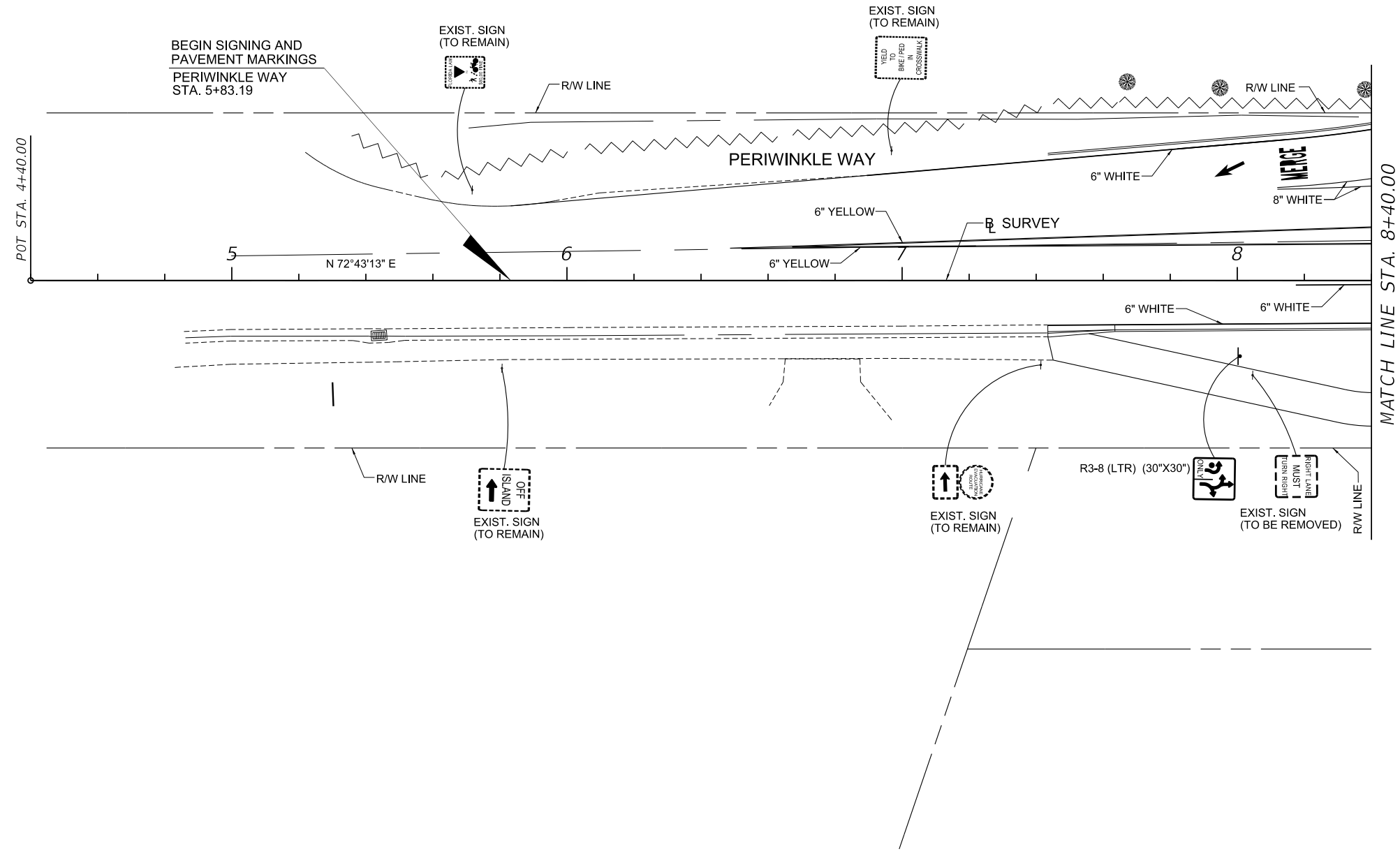


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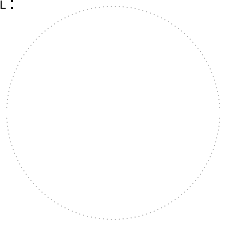
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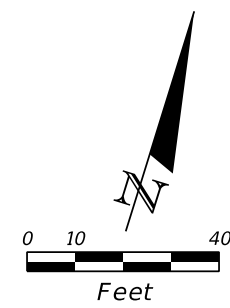
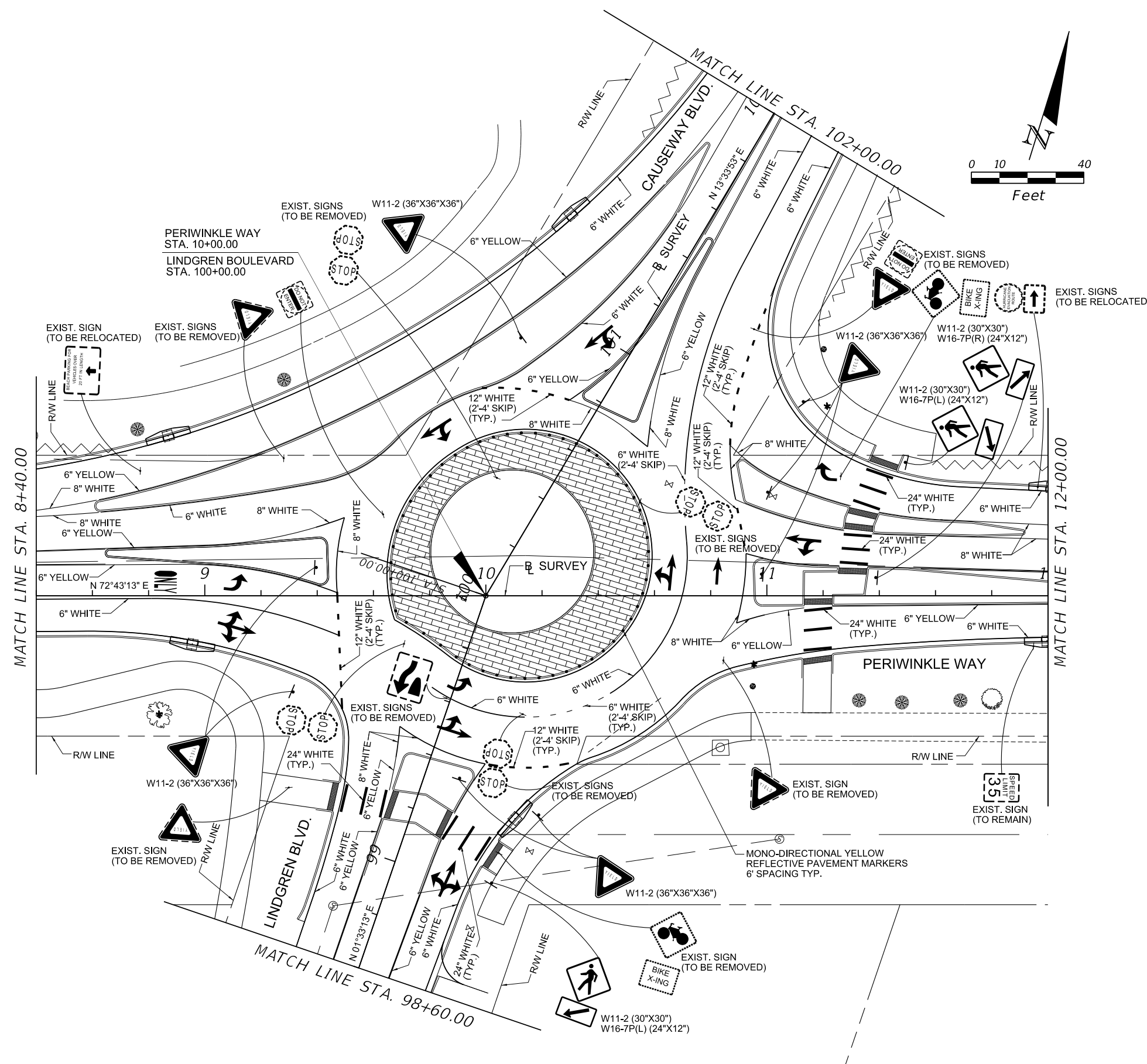
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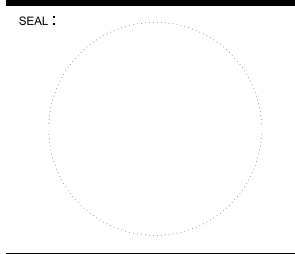
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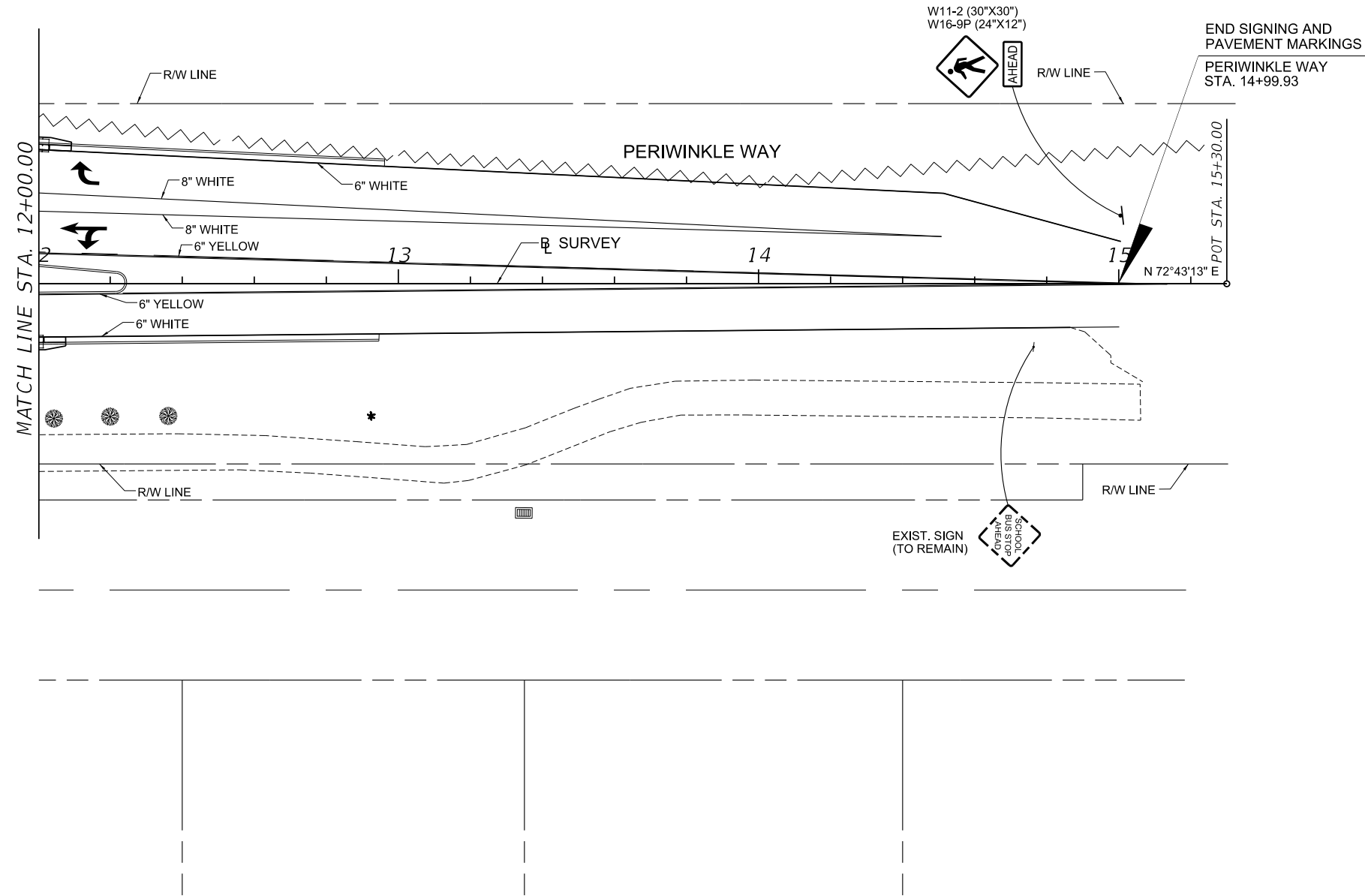
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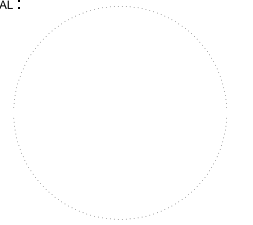
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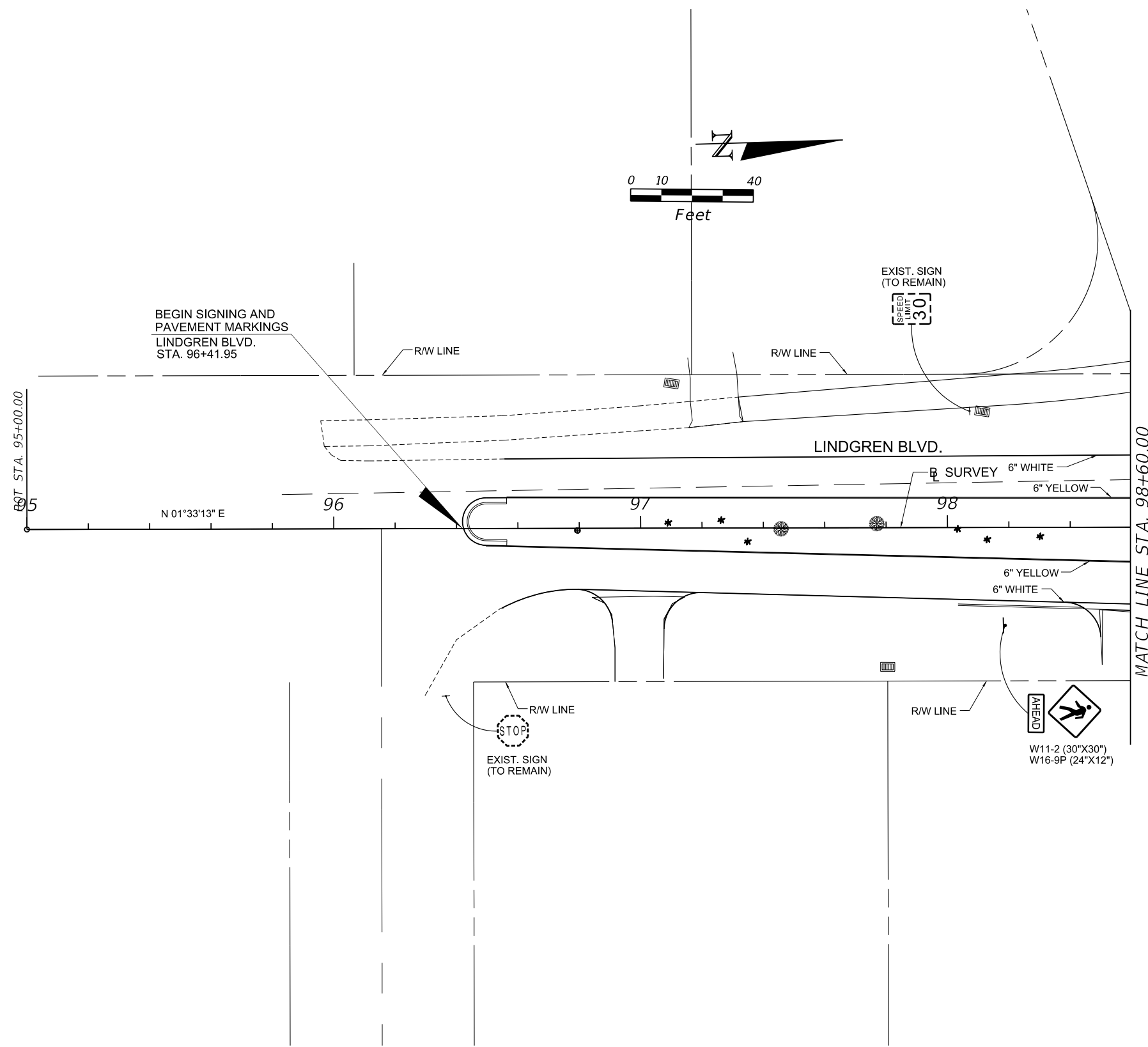
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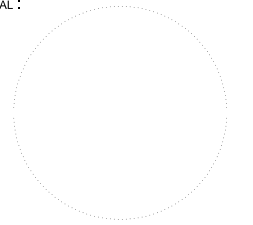
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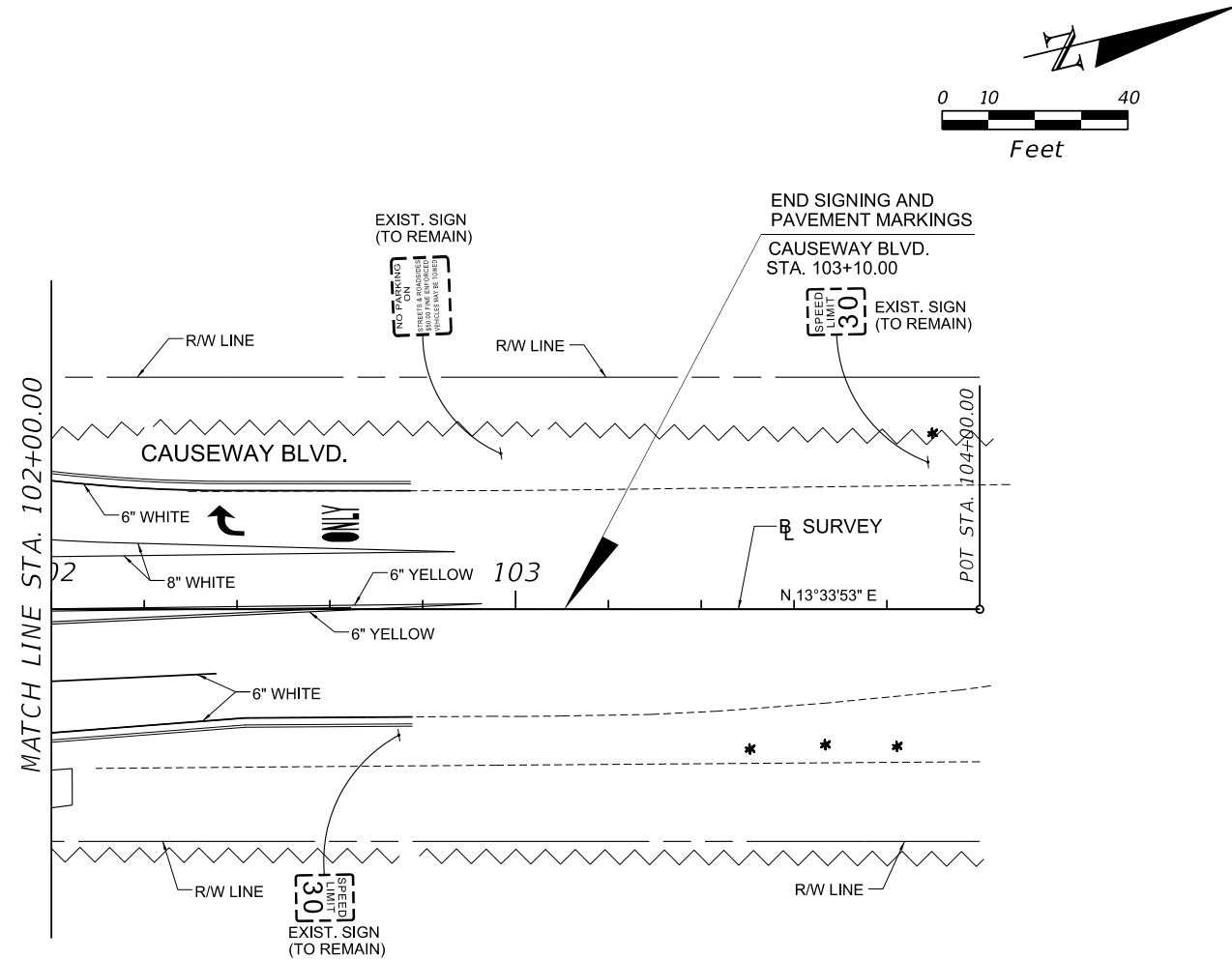
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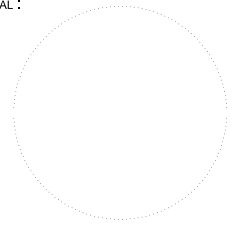
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Roundabout Study**

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**SIGNING AND  
PAVEMENT  
MARKING PLAN**

DRAWING NO :

**APPENDIX F**  
**30% DESIGN PLANS**  
**WINKLER AVENUE / CHALLENGER BOULEVARD**

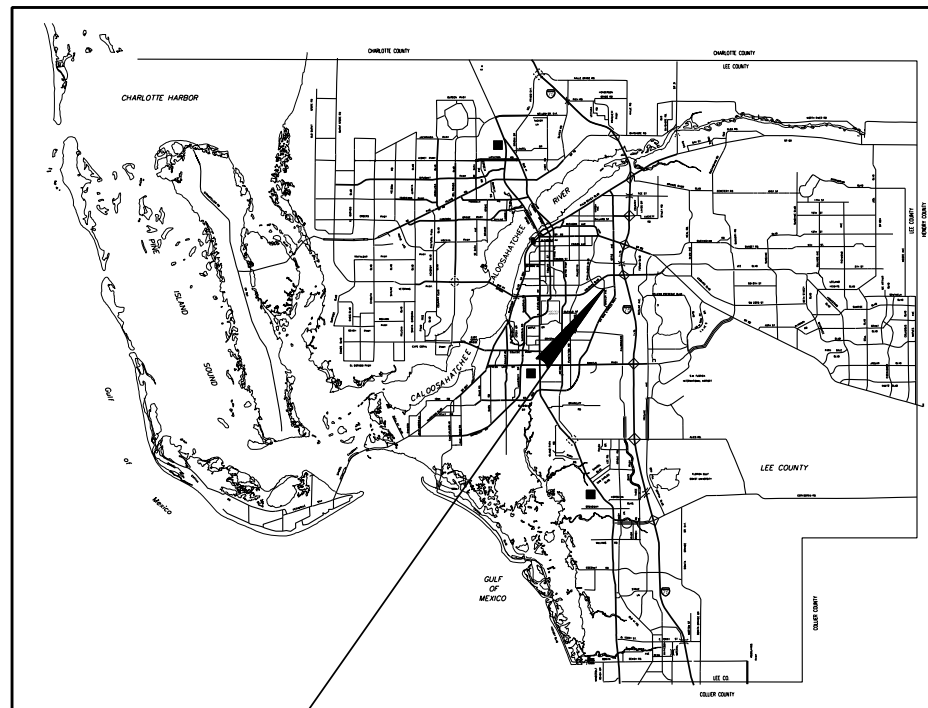
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# CONTRACT PLANS FOR ROUNDBOUT AT WINKLER AVENUE AND CHALLENGER BOULEVARD CITY OF FORT MYERS, FLORIDA

## INDEX OF PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2	TYPICAL SECTION
3-7	ROADWAY PLANS
8-12	GRADING PLANS
13-17	SIGNING AND PAVEMENT MARKING PLANS

GOVERNING STANDARDS AND SPECIFICATIONS:  
FLORIDA DEPARTMENT OF TRANSPORTATION,  
DESIGN STANDARDS FY 2016-17,  
AND STANDARD SPECIFICATIONS FOR ROAD AND  
BRIDGE CONSTRUCTION DATED JULY 2016,  
AS AMENDED BY CONTRACT DOCUMENTS.



PROJECT LOCATION

PREPARED FOR:  
LEE COUNTY  
METROPOLITAN PLANNING ORGANIZATION

**30% PLANS**



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815 Nicholas Pkwy E.  
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PROJECT NAME :

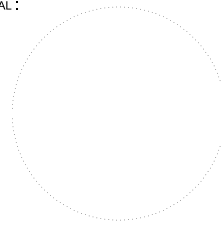
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Roundabout Study**

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REVISIONS/SUBMISSIONS:

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**KEYSHEET**

DRAWING NO :



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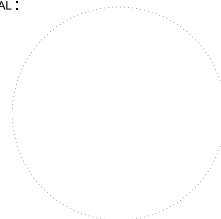
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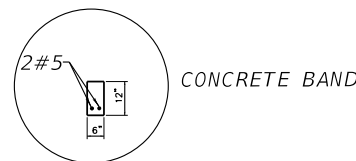
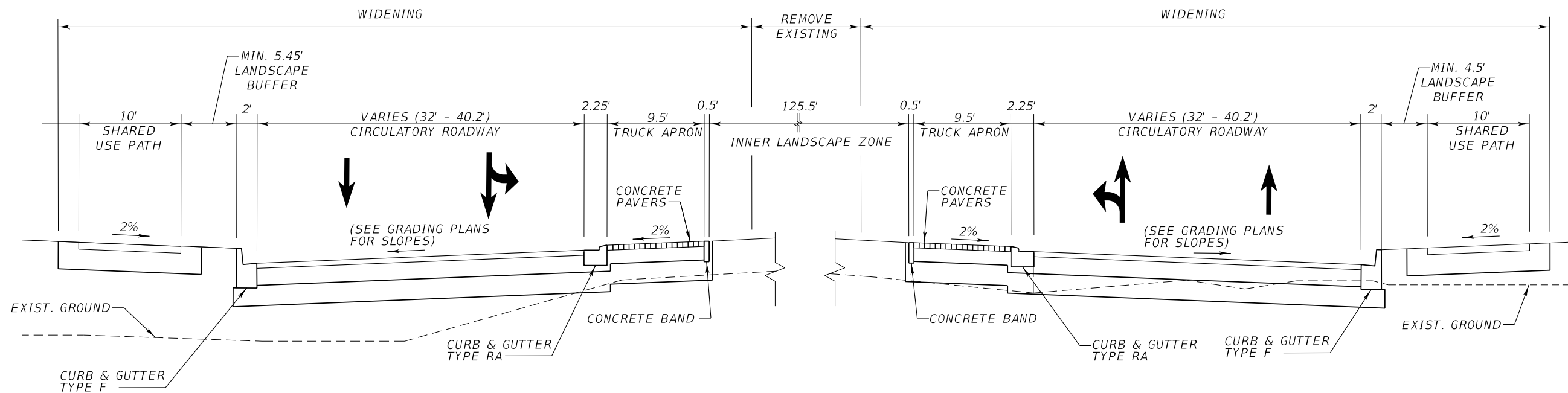
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TYPICAL SECTION

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ROUNDAABOUT TYPICAL SECTION  
AT WINKLER AVE AND CHALLENGER BLVD

NOTE:

COLOR SAMPLES AND SPECIFICATIONS  
OF THE PAVERS SHALL BE SUBMITTED  
TO THE CITY OF FORT MYERS FOR  
APPROVAL PRIOR TO INSTALLATION.

CIRCULATORY ROADWAY

---

TYPE B STABILIZATION (LBR 40) 12"  
OPTIONAL BASE GROUP 9  
WITH TYPE SP STRUCTURAL COURSE  
(TRAFFIC C) 2" AND FRICTION COURSE FC-9.5  
(TRAFFIC C) (1") (PG-76-22) (ARB)

TRUCK APRON

---

TYPE B STABILIZATION (LBR 40) 12"  
OPTIONAL BASE GROUP 4  
COMPACTED CONSTRUCTION SAND 2"  
WITH CONCRETE PAVERS

SHARED USE PATH

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TYPE B STABILIZATION (LBR 40) 12"  
CONCRETE SIDEWALK 4"

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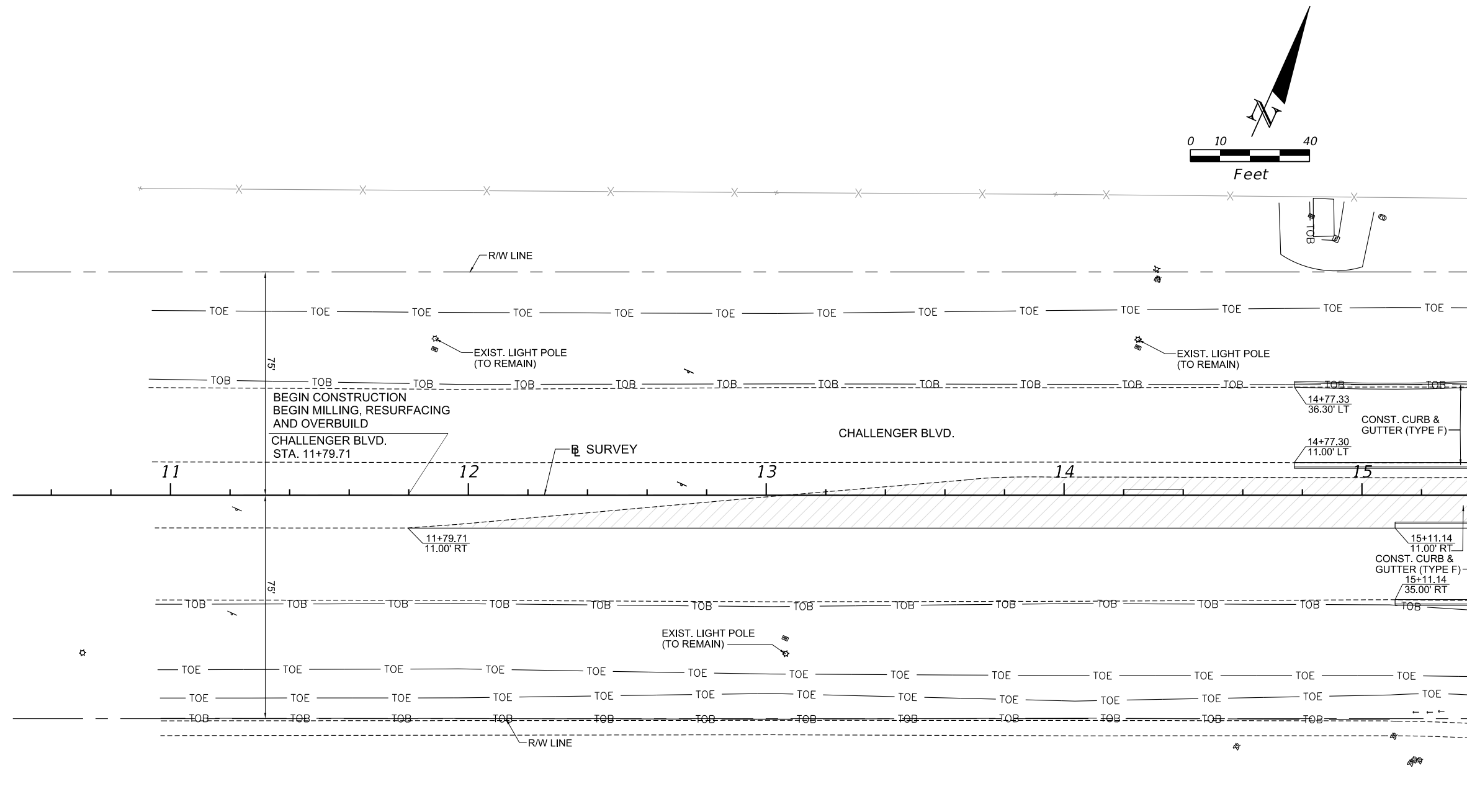


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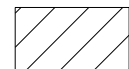
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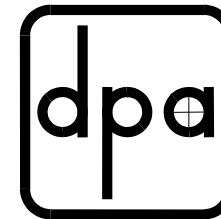
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MATCH LINE STA. 15+40.00



DENOTES REMOVE EXISTING PAVEMENT, BACKFILL AND SOD



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PROJECT NAME :

Lee County MPO Roundabout Study

JOB NUMBER : #14504 DATE : 11/03/2015 CAD FILE NO : AGENCY NO :

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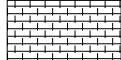
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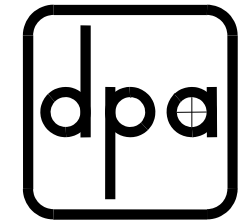
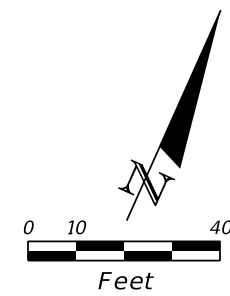
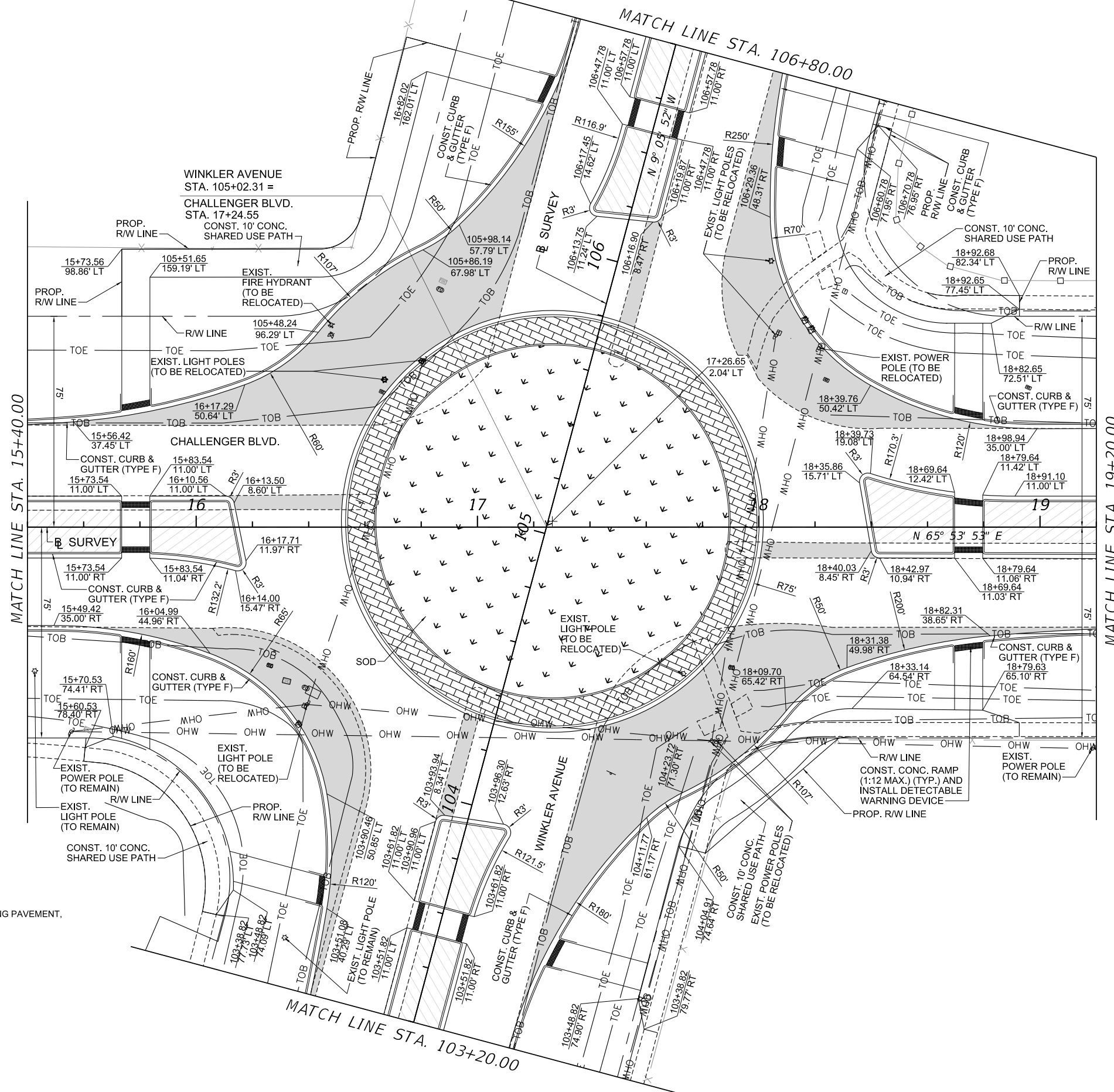
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-  DENOTES TRUCK APRON



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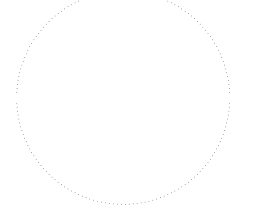
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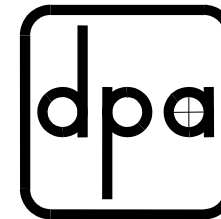
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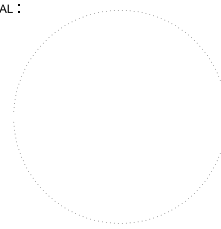
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JOB NUMBER : #14504  
DATE : 11/03/2015  
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AGENCY NO :

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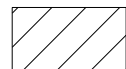
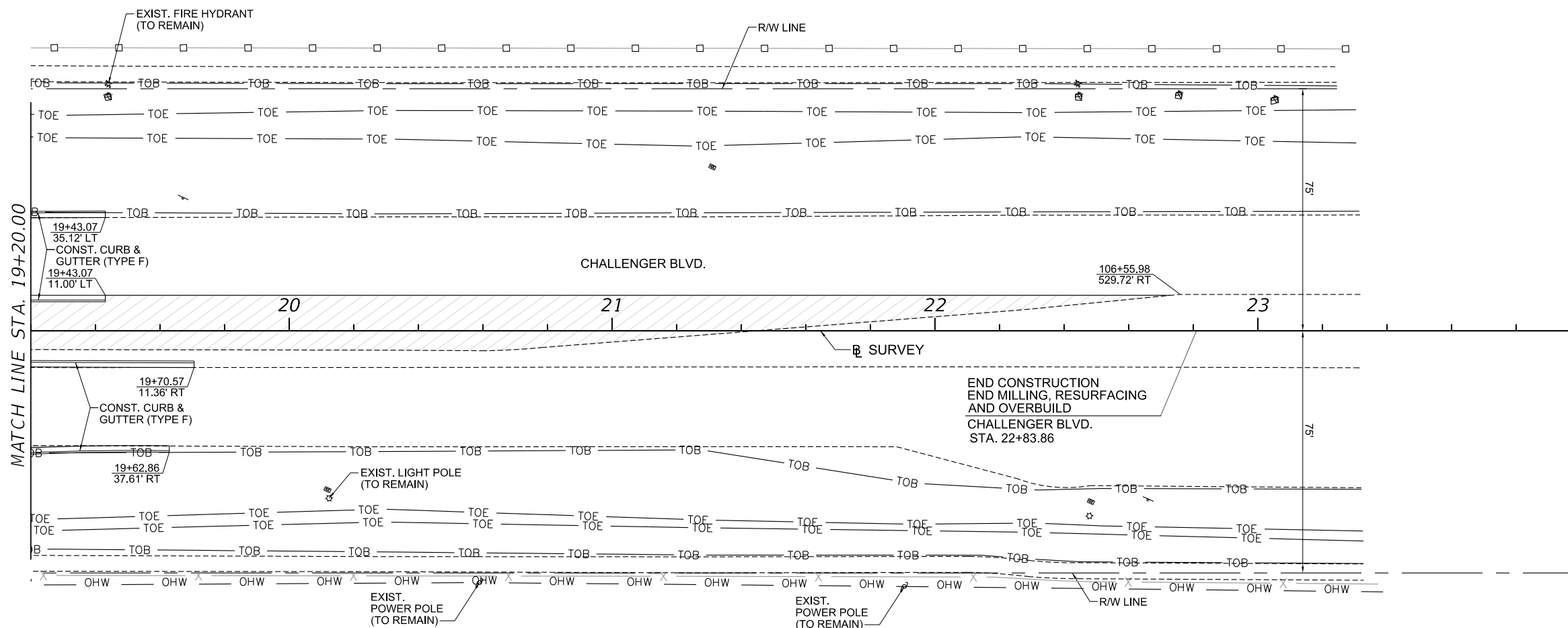
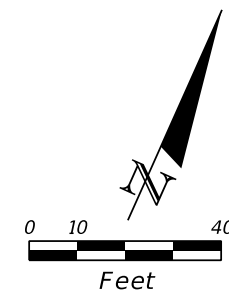


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ROADWAY PLAN

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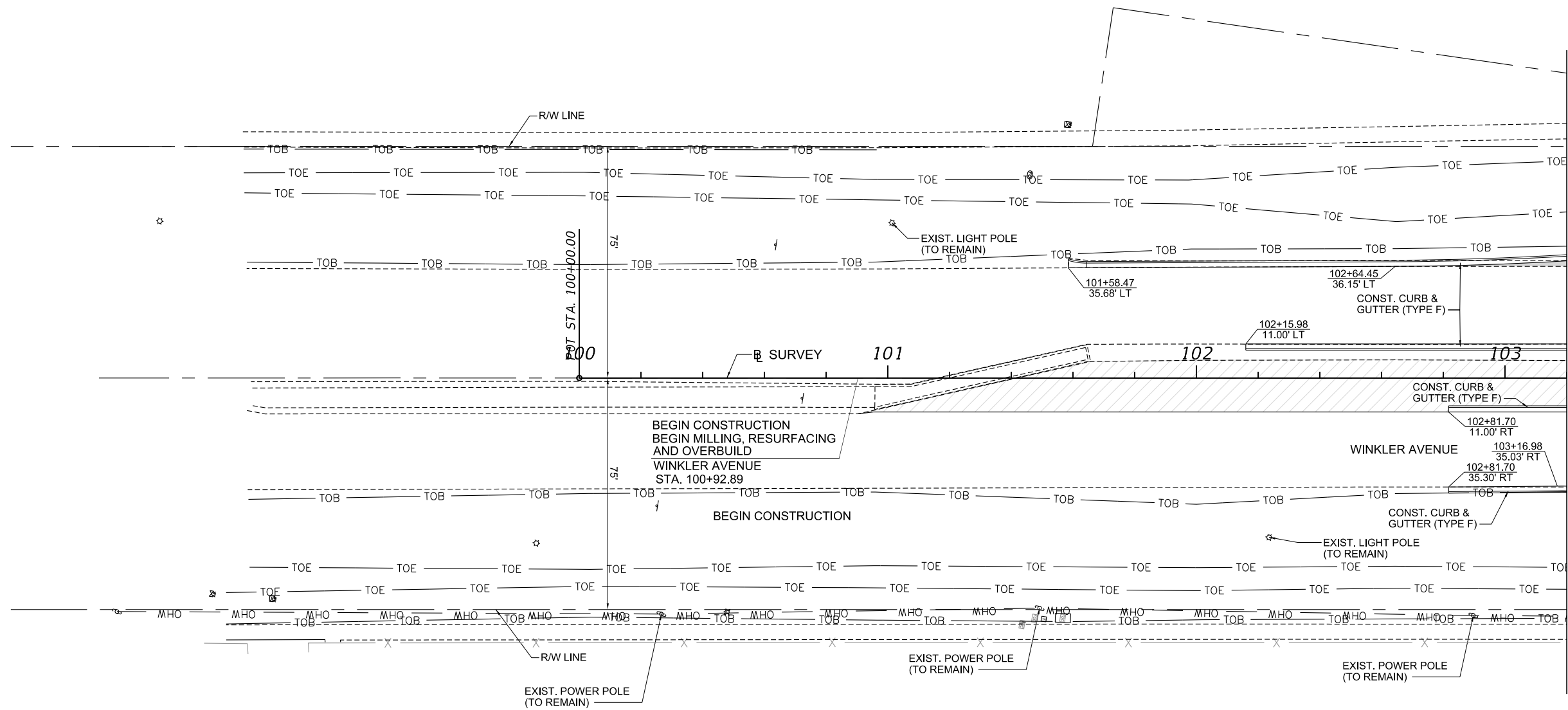
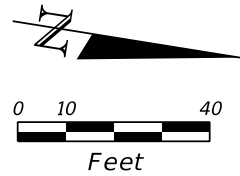
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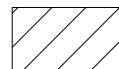
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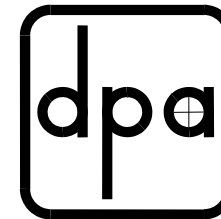
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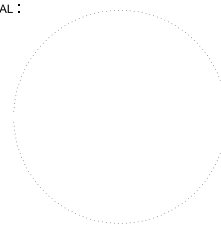
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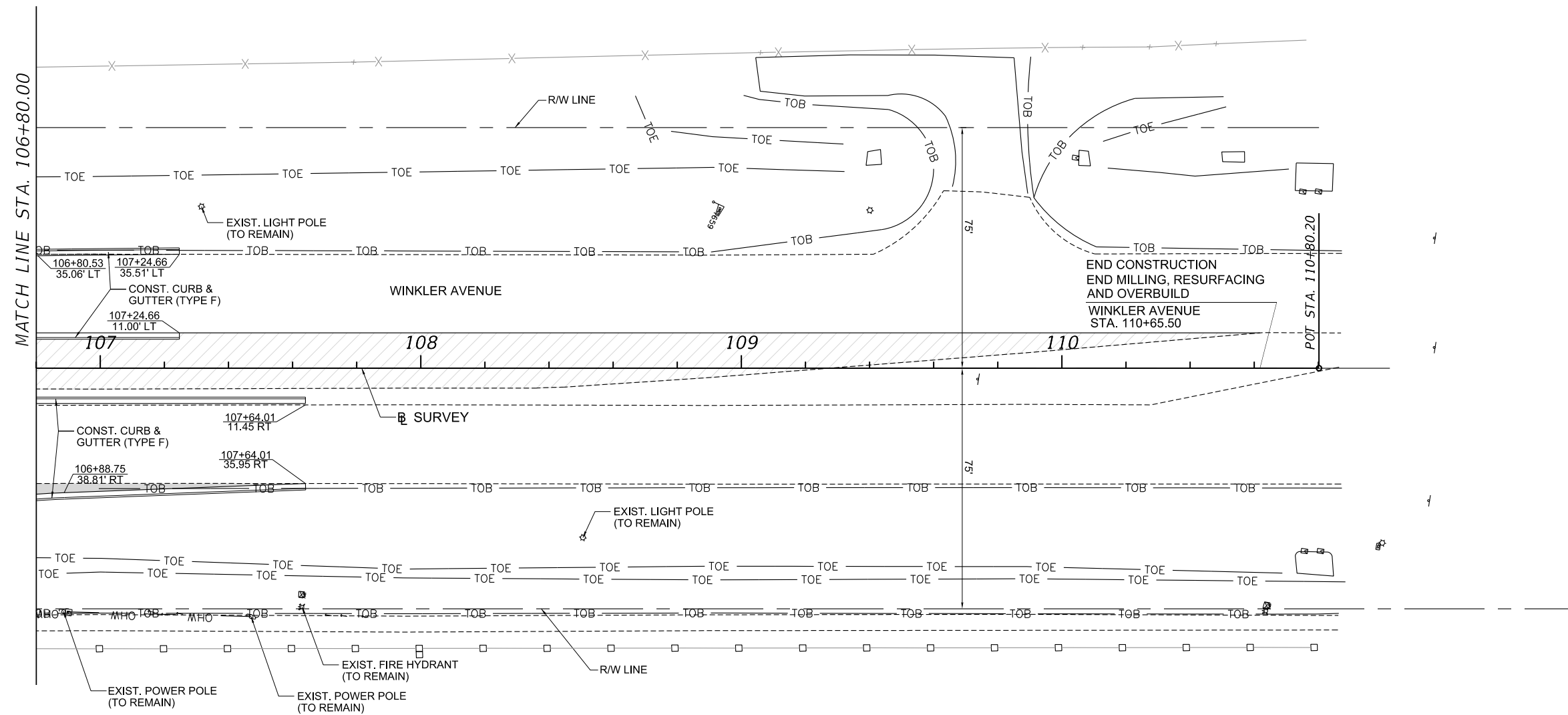
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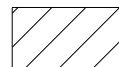
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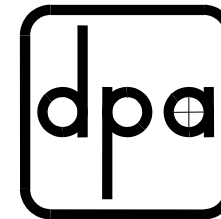
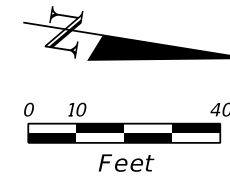
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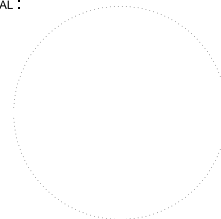
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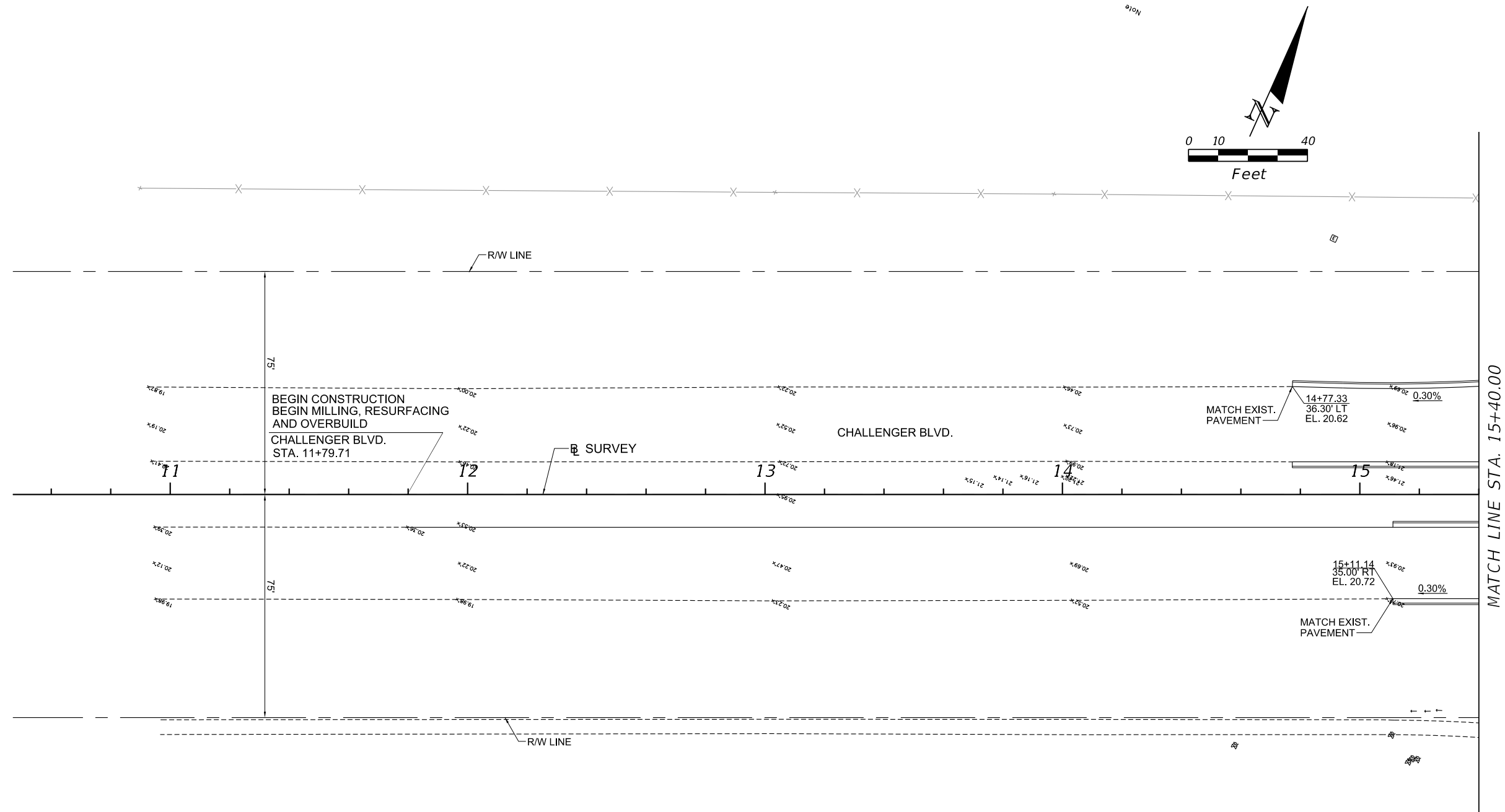
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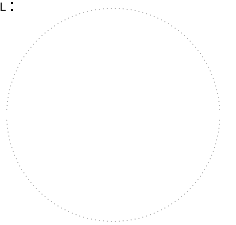
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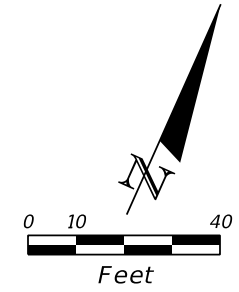
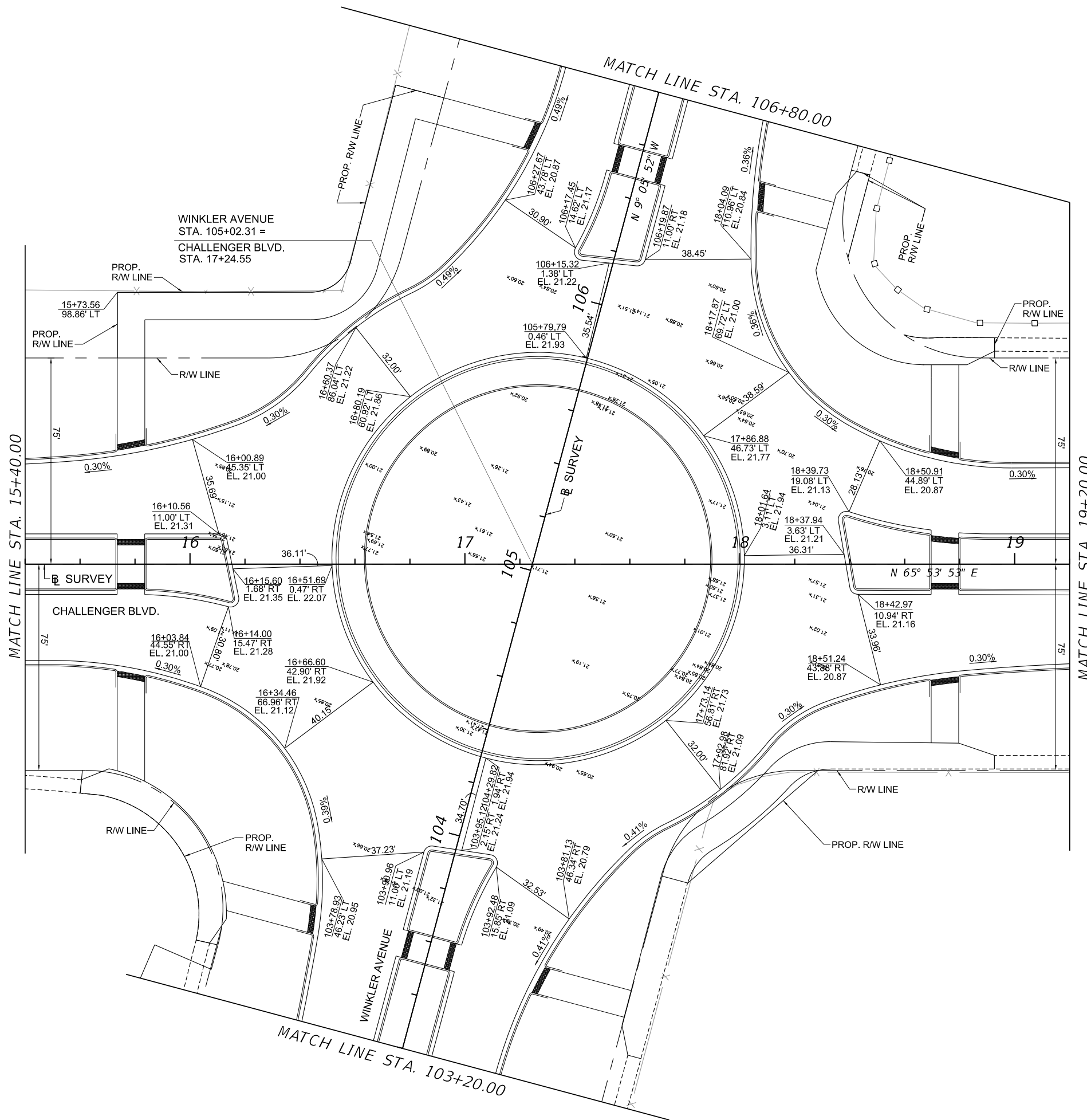


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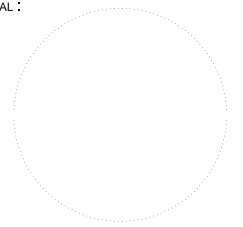
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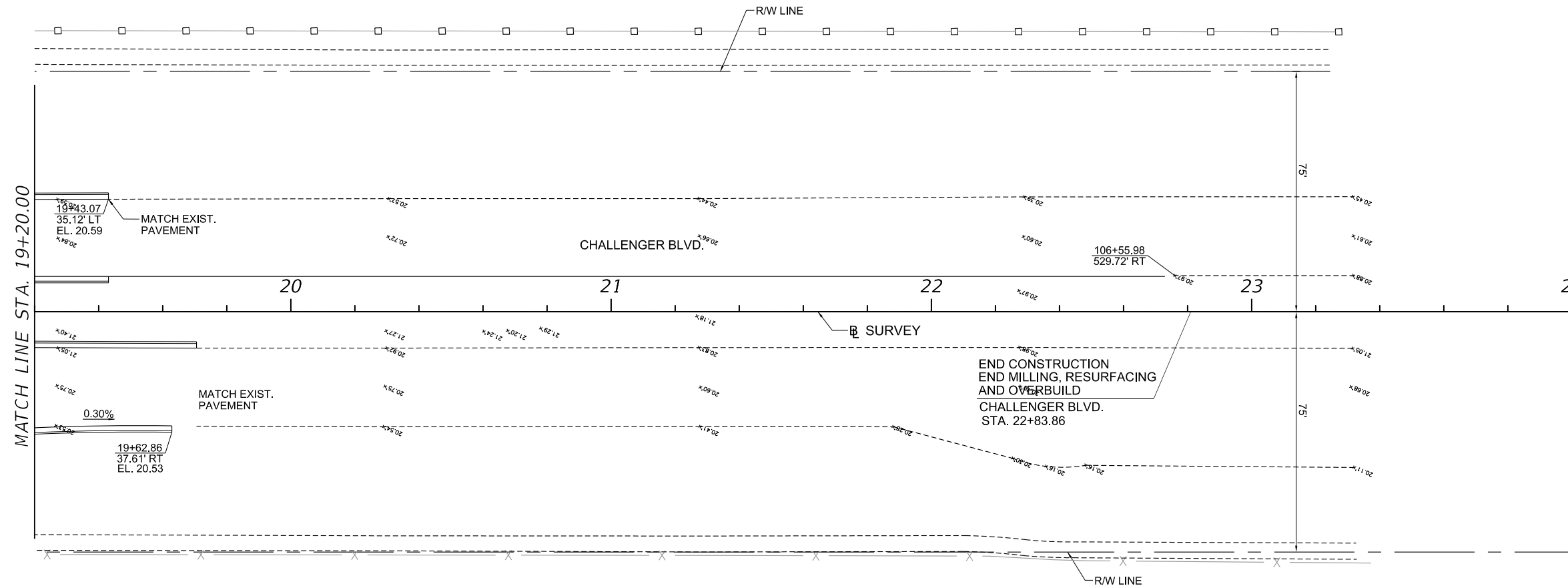
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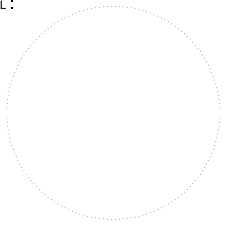
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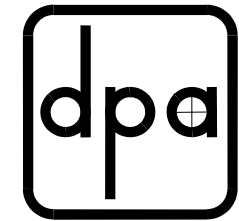
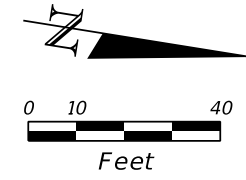
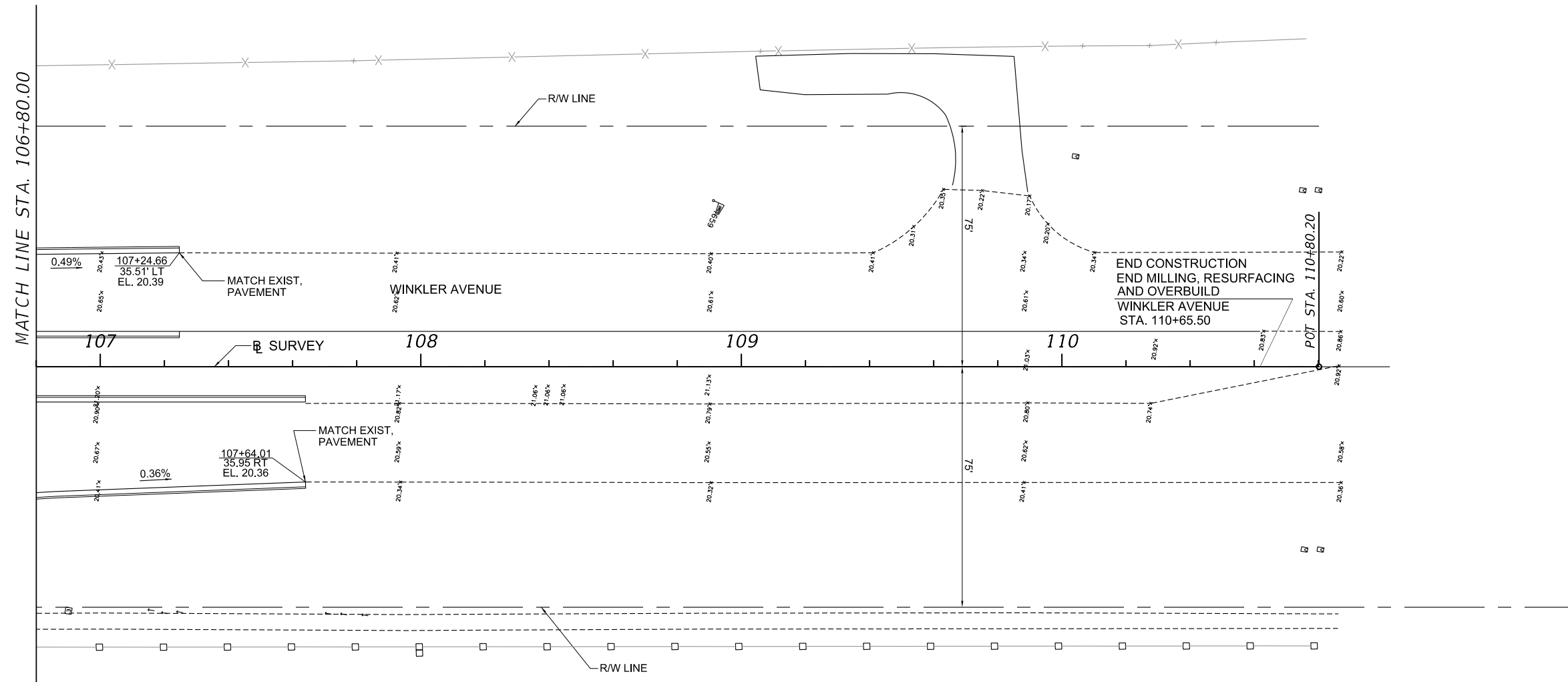


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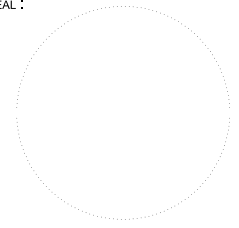
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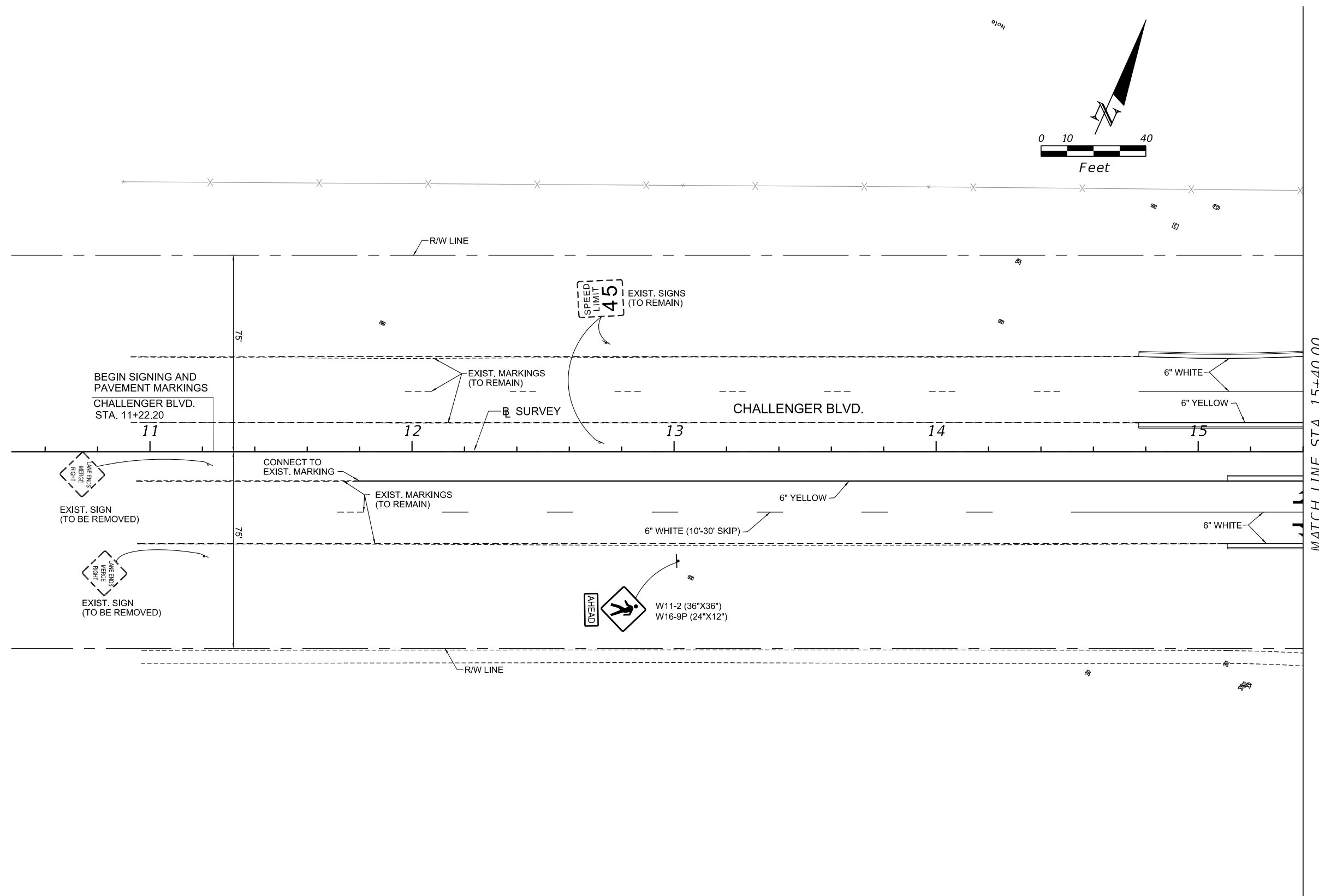
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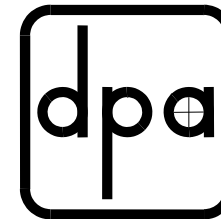
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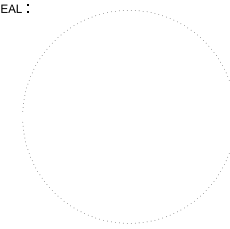
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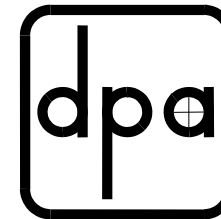
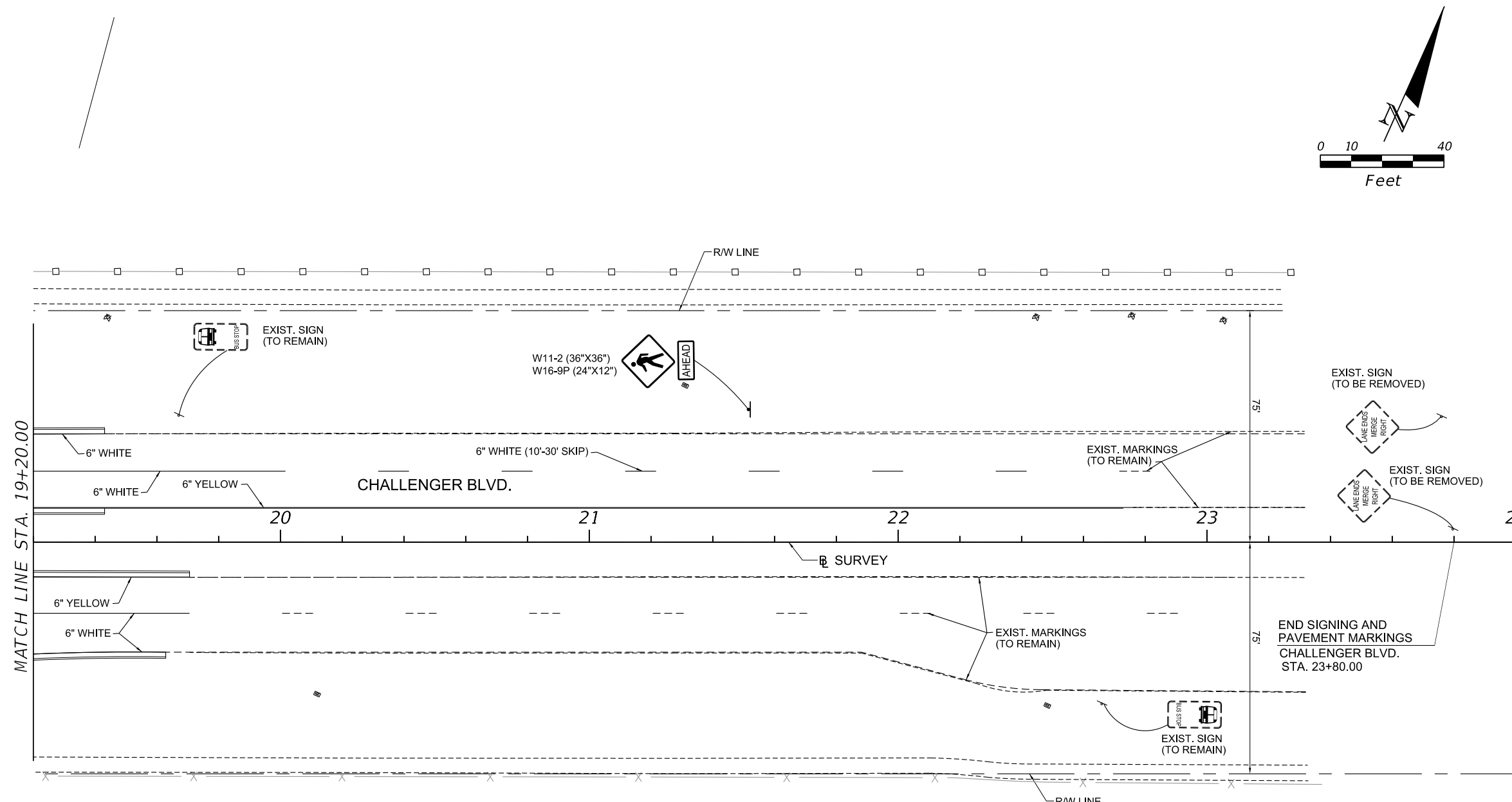


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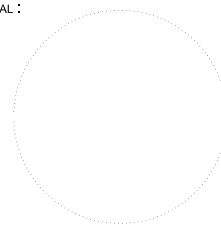
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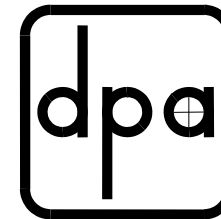
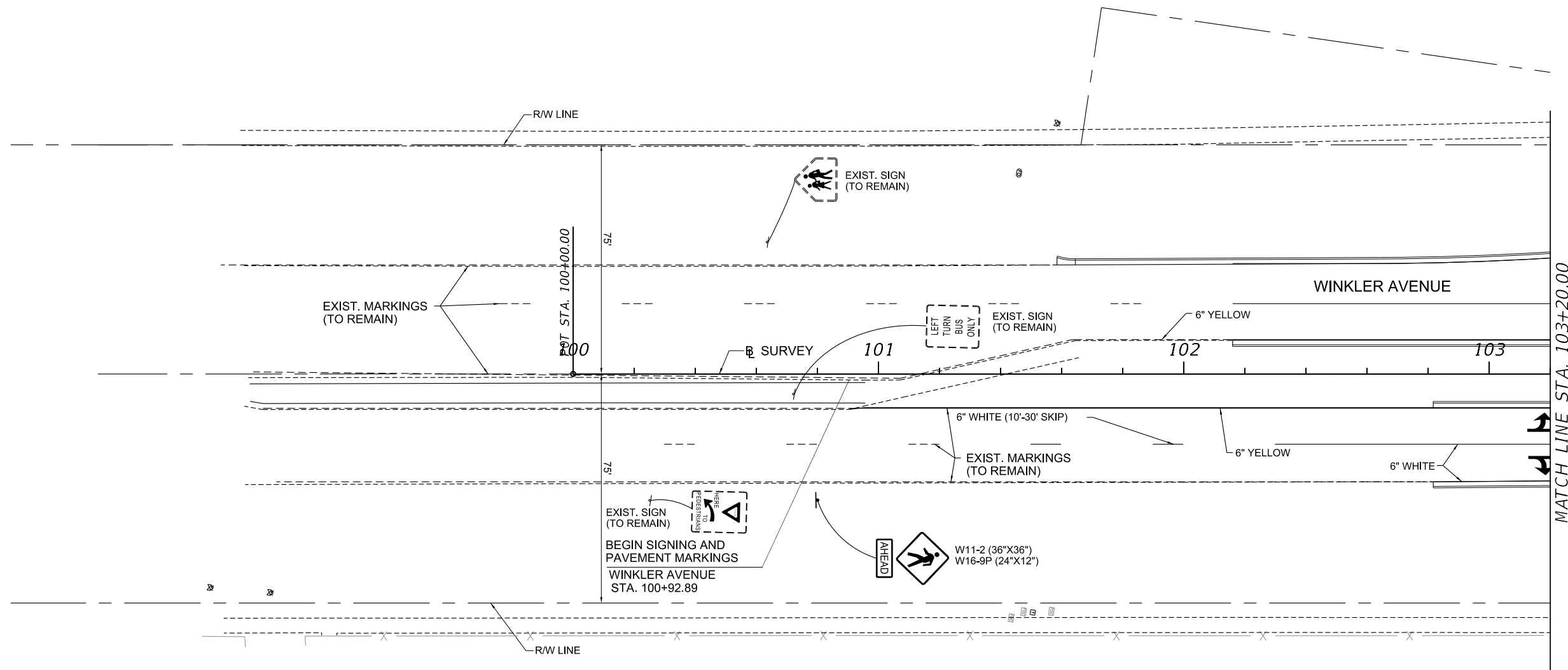
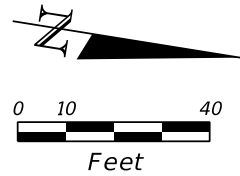
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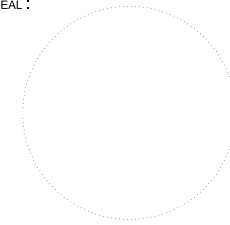
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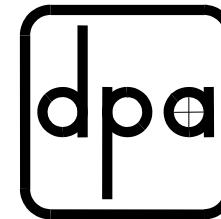
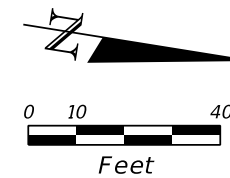
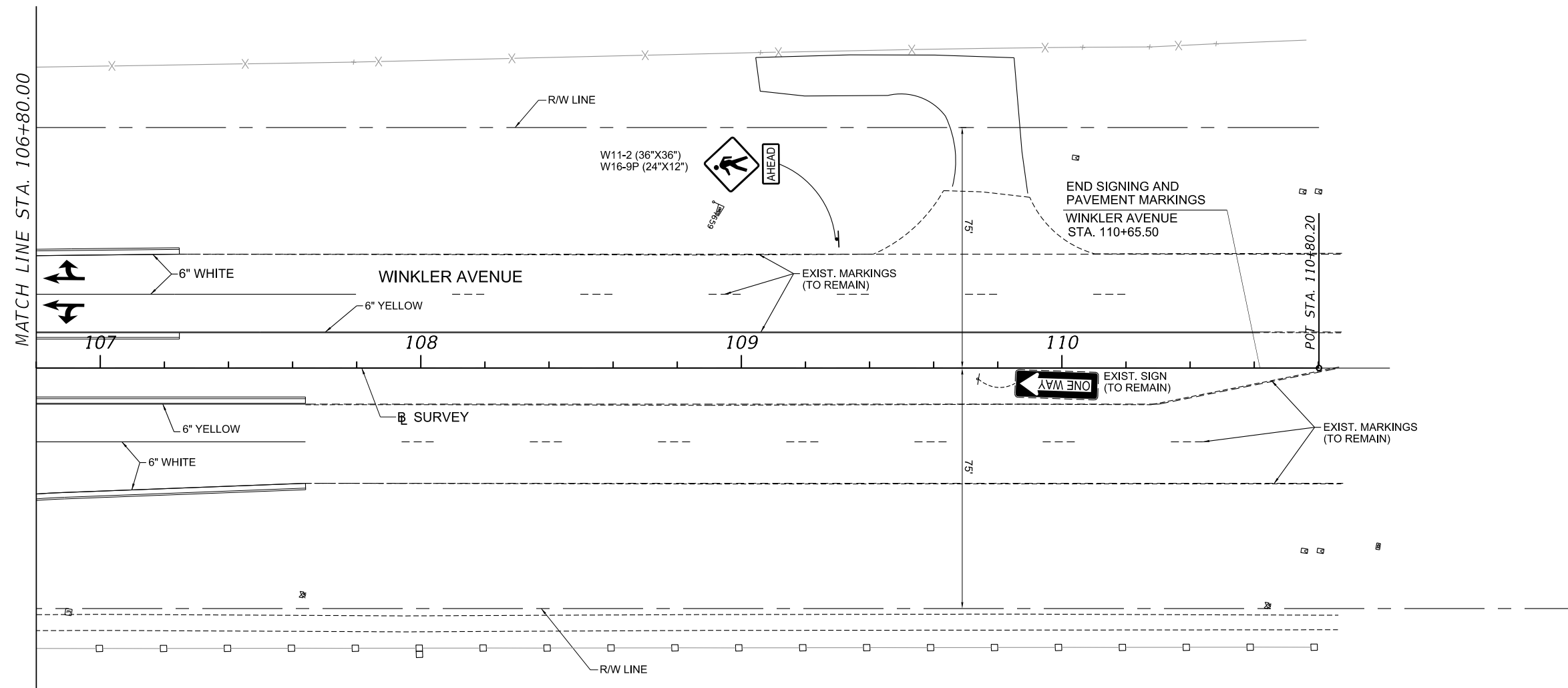
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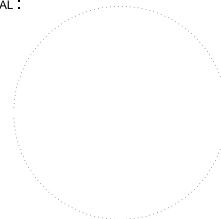
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